RESTRICTED

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY

BATTLE EXPERIENCES

JULY 1944 TO APRIL 1945

RESTRICTED

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This booklet consists of extracts from issues of "Battle Experiences", published in the European Theater of Operations from 1 July 1944 to 1 April 1945. This compilation is intended to present certain ideas and methods evolved during more than nine months of combat in more convenient form for reference and training use than was possible in the periodical form in which they were originally published. Although not necessarily applicable to all units in all situations, the items are the result of actual combat experiences of the units and individuals credited, and are recommended for careful consideration.

By Command of General EISENHOWER:

R. B. LOVETT
Brigadier General, USA
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Chapter One

PATROLLING AND RECONNAISSANCE

"All patrol members should study the field manuals on scouting, patrolling, use of weapons and small unit tactics. A guy from another unit once told me that over here you throw the manuals away. I never heard a statement more completely wrong. It was some time before I realized that if I wanted to get the job done and stay alive it was up to me to take what the field manuals say as my own rules."--Patrol Leader, 99th Inf Div.

I PLANNING AND PREPARATION.

1. Control by battalion. "This plan was adopted by a British battalion during a period when its primary mission was patrolling:

a. "The battalion commander designated a field officer as battalion patrolling officer. The patrolling officer established a patrolling headquarters and a patrolling OP in the battalion area. The headquarters included a briefing officer, certain intelligence personnel and operators for the OP. The commanding officer laid down general policies and the patrolling officer handled all details.

b. "One patrol, with a mission of liquidating an enemy outpost, established a base within radio range of patrolling headquarters and from that base moved out on the mission. This base, with its communication facilities, permitted continual communication with the battalion and would have constituted a sure rallying point if it had been needed. It also assisted in the evacuation of casualties."--Report from Italy.

2. Check lists for planning and interrogation. a. "The following report on a successful system of patrol planning and employment by the 102d Cavalry Reconnaissance Squadron (Mechanized) emphasizes early and detailed planning, and interrogation, using standard written forms for conveying and recording information. The method has been employed only in a static situation.

b. "The patrol orders are given to the patrol leader at least 36 hours before the time to depart, and he issues his order to the patrol in time to allow 24 hours for preparation, reconnaissance and inspections. The mission is made out on a fixed form sheet; the patrol leader puts his plan down in detail on another form, and upon return from the mission the patrol leader is interrogated by the battalion S-2 or S-3 and all information set down in detail on still another form. The interrogation system has proved more effective than requiring the patrol leader to submit a report because many details otherwise overlooked are brought out by the interrogator. The system has paid dividends in more efficient planning, conduct, and execution of patrol activity.

c. "The mission form given to the patrol leader includes the patrol's mission, size, times of departing and returning, routes and special instructions such as other patrols operating in the vicinity during the period.

d. "The detailed plan which the patrol leader must prepare in writing includes, in addition to the above information, an alternate route, formation to be employed, communications plan, signals for control, disposition of any attached personnel (artillery, medical, engineers), method of employment of supporting weapons, action of patrol upon contact with enemy or upon discovery of mines and booby traps, plan of defense if ambushed, assembly or rallying point if elements are separated, and the support to be called upon if ambushed.

e. "The interrogation form records all information obtained, such as actual times of departure and return, the routes actually followed, enemy observed, prisoners taken, action taken under special circumstances, and patrol losses if any."--V Corps Observer.

3. Only one mission. "Only one mission should be given to a patrol and it should be definitely and clearly stated. If you are given two or more missions such as 'penetrate as deeply as you can and bring back a prisoner', one of the two missions is bound to suffer. The result is that you are not successful in either."--Patrol Leader, 79th Inf Div.

4. Briefing. "I like to have the assistant patrol leader briefed at the same time I am. Two heads are better than one and the assistant assumes more responsibility when he is briefed with me.

5. Special "patrol dugout" increases efficiency. "Efficiency of patrols is greatly increased by having a warm, lighted dugout in each battalion area reserved exclusively for patrols. At least an hour and a half before the start of the mission the patrol leader can assemble all members there and accomplish the following: Warm the men, thoroughly instruct each man, field strip, clean and dry each weapon, and review each man's duties. Giving the men a chance to drink some hot coffee, study aerial photographs, and talk over the mission helps them to become a team and makes a lot of difference in their performance.

6. Artillery can help in two ways. "Prior to departure, reconnaissance patrols should coordinate with the artillery in the selection of three or four easily recognizable base points. The patrol should communicate directly with the artillery by means of the SCR 300, so they can get rapid action on requests for supporting fire or smoke rounds for orientation."--Patrol Leader, 99th Inf Div.

7. Give all outposts exact information. "It isn't enough to warn men on the outpost line that friendly patrols are operating to their front. They all should be told where they are operating and what time to expect them to return."--S-2, 60th Inf Regt.

II EQUIPMENT.

8. Ammunition. "I have my patrols carry only armor-piercing ammunition as it will go through trees. It is a good idea to have two or three thermite grenades along to destroy gun barrels and start fires.

9. Medical aids. "Make sure that each man has his first aid kit. Also have some men carry morphine syrettes in a designated pocket so that everyone knows where to find them. All men should be given special instruction in the use of the syratte. Another wise precaution is to have every man carry some of the excellent cough tablets which our medics sometimes can get for us."--Patrol Leader, 99th Inf Div.

10. Pads. "Our men have found knee and elbow pads helpful when patrolling on hard ground."--CO, 2d Bn, 405th Inf Regt.

III COMMUNICATIONS.

11. SCR 536 and sound-powered telephones. "A combination of sound-powered telephones and SCR 536 radios has been used successfully to provide contact with patrols and to enable the squadron commander to give them any necessary artillery or mortar support. The telephones are used from the squadron S-2 to the outpost nearest the area being reconnoitered and the SCR 536s provide the link between the outpost and the patrol."--CO, 17th Cav Rcn Sq.

12. Telephone network. a. "A system for telephone control of patrols from battalion headquarters was worked out by the 1st Ranger Battalion in Italy and Africa. Communication was provided from each patrol to its parent unit and to other patrols which were operating simultaneously. Field telephones (preferably sound-powered) and light field wire on half-mile spools were carried by each patrol.

b. "The following example illustrates the method: At dusk each of six patrols hooked into the battalion switchboard and proceeded along the prescribed route to the end of the first spool. Each patrol then checked in, using prearranged identification numbers, and received any further orders. Calls were made from each successive half-mile check point. Patrols talked to each other through the switchboard and sometimes coordinated their movements to take aggressive action against enemy groups or installations in the area.

c. "The coordination afforded by the system tends to increase the confidence of the men and facilitates longer periods of activity by each patrol."--CO, 1st Ranger Bn.

IV TIPS THAT WILL AID IN CARRYING OUT THE MISSION.

13. Routes. a. "Do not repeat patrol routes on successive days.

b. "Draws are easy terrain features to follow, but experience has taught us to work on the ridge, or halfway up it, guiding on the draw rather than traveling along its bottom. The enemy usually covers the natural approaches with fire.

c. "Even though terrain features are available to guide on, azimuths of proposed routes should be studied. Knowing the azimuth helps in checking location and selecting new routes in case of unexpected occurrences.

d. "Patrols should avoid leaving their lines from an outpost or returning directly to one. A patrol followed us in and shot one of our officers at an outpost. Watch for the enemy behind you."--S-2, 60th Inf Regt.

14. Booby traps. "We had some success detecting booby traps by having one man precede us through a known minefield holding a small stick lightly between his fingers at an angle of 45 degrees, with the end about two inches off the ground. He detected eight booby traps in one day by feeling the pressure of the trip wires on the stick. Some trip wires are neck high, others only six inches or less off the ground. If you find one booby trap there are generally more.

15. Enemy fire. "When you run into automatic fire don't hit the ground and be an ostrich. Keep your head against the ground but look about you. You often can see where the bullets are flicking the trees and you can generally get a fair idea of where the gun is.

16. Enemy positions. "Just because you find a group of foxholes empty one day, don't assume they will be empty the following day. Don't be tempted to leave an ambush patrol in empty enemy foxholes. If the enemy catches on, he has plenty of time to move in and he is on terrain with which he is familiar."--Patrol Leader, 99th Inf Div.

17. Don't get excited. "In wooded or hilly terrain the enemy will allow the lead man to come through their lines and when the other members of the patrol can be observed the enemy starts shouting, whistling, and firing a few rifle shots from either flank. If the patrol leader loses his head and tries to pull out, the patrol is liable to suffer casualties and become disorganized."--2d Bn, 47th Inf Regt.

18. Withdrawal. "Many patrols have successfully accomplished their missions only to lose personnel by a hasty, noisy withdrawal. Night patrols go out stealthily, taking all precautions, but forget all that in getting back to safety. Remember it is as easy to get hit in the back as in the belly."--Plat Leader, Co B, 116th Inf Regt.

V USE OF THE AIR OBSERVATION POST FOR RECONNAISSANCE.

19. "We back up cavalry reconnaissance with air OP patrols. At one time we organized a tactical reconnaissance for the corps commander to report on traffic and bridge conditions, location of leading elements and to cover exposed flanks, etc. G-3's sole data at one stage came from air OPs. We also reported location of enemy tanks to our own tank elements, who then deployed and surrounded the enemy."--VIII Corps Arty Air O.

VI DON'T WASTE PATROL EFFORT.

20. A corps commander makes the following comments: a. "It should be emphasized that ground once gained cheaply should be held. Time after time a patrol is sent out to determine the enemy strength on some hill and finds that the hill is unoccupied. Almost invariably the entire patrol comes back to report. Then some unit is ordered forward to occupy the hill. It moves forward and finds the hill alive with enemy who smother them with fire from machine pistols, light machine guns and mortars.

b. "The same thing holds true at bridges. Several times a patrol has found a bridge not blown and the entire patrol has come back to report. Before some other unit can get up to seize the bridge, the enemy has blown it."--Report from Italy.

VII PROVISIONAL RECONNAISSANCE SQUADRON IN AN INFANTRY DIVISION.

21. "The division reconnaissance troop was incapable of maintaining necessary continuous mechanized reconnaissance in open country. A provisional reconnaissance squadron was formed, consisting of the division troop, the reconnaissance company of the attached tank destroyer battalion, and the light tank company of the attached tank battalion. An attempt was made to keep only four platoons committed but on many occasions the necessity for reconnoitering all routes, maintaining contact with adjacent units, and screening the flanks, required the commitment of five or six platoons. Difficulty with communications was reduced by the use of relay stations."--3d Inf Div.

VIII PATROL INSTRUCTION.

22. "We took our patrol leaders on a tour of inspection of a recently captured area in which we had held a static line and had patrolled nightly. A study of the terrain from the enemy's side showed us mistakes we had made in our patrolling."--9th Inf Div.

Chapter Two

EMPLOYMENT OF INFANTRY WEAPONS

I 81MM MORTAR.

23. Battery fire in a battalion. "The battery fire of our 81mm mortars is directed from a control center which includes the platoon leader, who computes the fire data; the platoon sergeant, who passes the orders to the mortars and coordinates their fire; a messenger--radio operator; and a wire repair crew of two men. Communication is by sound-powered telephone to each of the three mortar sections, EE-8 telephone to the battalion command post, and SCR 300 or SCR 536 radio and sound-powered telephones to the two observation posts."--Ex O, Co D, 315th Inf Regt.

24. Capabilities of combined use. "We fire 81mm mortars as battalion batteries, employing control similar to that used by artillery. This has made possible the simultaneous use of the mortars of all three battalions on regimental targets.

a. "The types of fire employed are as follows: (1) "Mortar time on target (MTOT), in which all rounds strike a selected target at the same time.

(2) "Mortar time on line (MTOL), in which all rounds strike along the same line simultaneously.

(3) "Mortar time on area (MTOA), in which each battalion battery fires on a battalion line, each battalion at a different range, giving simultaneous area coverage.

(4) "Rolling barrage, which employs either MTOL or MTOA fire, increasing the range for each round.

b. "No time-of-flight tables are available for mortars. In order to place simultaneous fire on regimental missions, each battery registers on the prescribed target and records time of flight.

c. "When using this type of barrage on known targets, it is most effective to fire one round per mortar, repeating the fire any number of times at odd intervals. The enemy usually finds cover before a second round strikes.

d. "Enemy prisoners of war stated that the fire was very effective chiefly because they never knew when it was going to strike next. In one case they were even afraid to get out of foxholes to feed in their company area. Small details had to be sent around from hole to hole with the food. We also sniped at these details with 60mm and 81mm mortars."--CO, 117th Inf Regt.

25. Planned target areas. a. "In the attack, control of fires is based upon use of a map divided into numbered thousand-meter grid squares. Field observers, using SCR 300, call for fire in a particular section of a given square. The mortar platoon leader computes the data and fires on the area. By using this system observers can place fires accurately without knowing the exact location of the mortars.

b. "In the defense, a continuous band of numbered target areas is planned across the entire front and an overlay given to each rifle company commander. The mortars are laid so at least one piece can fire on each area without moving the bipod. Accurate fire can be placed within a few seconds after the call is received. By use of this method, mortars have been successfully used to drive off hostile night patrols, thereby eliminating the necessity of disclosing the positions of automatic weapons."--Co M, 313th Inf Regt.

26. SCR 300 for platoon leaders. "Control of the 81mm mortar platoon is by SCR 300. Giving the platoon leader one of these sets permits each mortar observer with a rifle company commander to call for fire direct, over the rifle company SCR 300. The heavy weapons company commander exercises any necessary control by using the SCR 300 of the battalion commander.

27. Displacement. "The mortar platoon leader must be given great freedom of decision as to movement. He displaces weapons forward only when necessary to remain in close support as the movement of ammunition is a difficult problem.

28. Reorganization. "Upon reorganization the 81mm platoon moves up near the center of the battalion zone and is immediately prepared to lay protective fires, or hit targets of opportunity. Smoke is ready if needed and reconnaissance is made for further movement. If the final objective is reached, defensive fires are plotted and security--especially to the rear and flanks--is put out or requested."--28th Inf Div.

29. Coordination with riflemen. "When we fire a preparation with mortars the last round from each weapon is smoke. When the infantry see the smoke they advance. Even if the enemy catches on to this system we have the jump for he can never be sure that the fire has lifted."--Ex O, 12th Inf Regt.

30. Simple code for observers. "We employ a simple code to give observers the mortar locations after displacement without violating radio security. The codes, which are changed often, are set up in 10-letter groups as in the following example:

LUCKY	STRIP
12345	67890

Coordinate figures can be given by transmitting the corresponding letters in the phonetic alphabet."--39th Inf Regt.

31. Don't announce mortar ranges. "We avoid announcing mortar ranges over the SCR 536 radio by using names for the key ranges--for example, 'Roger' might mean 1,000 yards. Code words are changed daily."--Wpns Platoon Leader, Co A, 377th Inf Regt.

32. Night firing. "A small flashlight bulb taped to the front of the M-4 mortar sight so it will shine through the collimator makes sighting on aiming stakes considerably easier when firing at night."--Pvt Bernard Raimey, Co D, 405th Inf Regt.

33. Range deflection fan. a. "A mortar range deflection fan improvised from celluloid material has facilitated both the obtaining of fire data from maps and aerial photos and the correction of these data. Its use permits putting effective 81mm mortar fire on new targets with maximum surprise and minimum adjustment rounds.

b. "The index point of the fan represents the mortar and base stake and the center line is the base line. Six lines spaced at 150-mil intervals radiate from the index point on each side of the base line on the azimuths of the six left and six right base stakes. Broken lines are placed between them at 50-mil intervals. Range scales are added.

c. "Fire is adjusted on the base point and two check points. The check points are selected prominent objects and should be about four or five stakes right and left of the base line. First the base point is fired, base deflection marked and stakes set out. Then, placing the deflection fan on the map, the right and left check points are selected and the data for each determined. Fire is then placed on each check point and recorded on a correction table. Data for the intermediate targets are based on corrections determined by firing on the check points."--Lt, Co D, 302d Inf Regt.

34. Use of map templates for calling for mortar fires. "We use small map templates, made by cutting the issue template into four equal parts, for designation of targets by mortar forward observers. The six squares in each small template are designated by the letters ABC on the top row and DEF on the bottom row. A base point is selected from which the template can cover the majority of targets on the battalion front. This base point is always a grid line junction. The template is placed with its lower left-hand corner

on the base point, and the targets are designated by indicating template coordinates such as Dog 16 and Charlie 51. Should the situation change so a base point is no longer usable, the forward observer can himself change to another suitable point, giving it in the clear when calling in his new target. During all calls care is taken that the word template is not mentioned."--Lt, Co H, 117th Inf Regt.

II 60MM MORTARS.

35. Combining 81mm and 60mm mortars. "We employ one 60mm mortar from each rifle company in battery with the 81mm mortars. In close fighting, 81mm mortar positions usually are within 60mm mortar range of the targets and there are two advantages to the combination:

a. "Expenditure of 81mm mortar ammunition is reduced. Previously, some 81mm mortar ammunition was used simply because the rifle company commander could communicate with the 81mm mortar platoon more easily than with his own 60s.

b. "There are fewer casualties among 60mm mortar crews because the 81mm mortars are usually in better sheltered positions."--S-3, 18th Inf Regt.

36. Flexibility. "I use my 60mm mortars against automatic weapons. When moving against intermittent resistance, one mortar is attached to a rifle platoon. When strong resistance is encountered, the mortars revert to the weapons platoon and are fired from positions 75 to 100 yards in rear of the leading elements."--Bn Comdr, 22d Inf Regt.

37. Mixing types of shells. "We use 60mm high explosive and illuminating shells alternately. The Jerries freeze in position when the illuminating shells are fired and heavy casualties can sometimes be inflicted with the following round of high explosive." --Bn CO and Bn Ex O, 329th Inf Regt.

38. Illuminating shells. "The 60mm mortar illuminating shells fired with four or more powder increments produce a muzzle blast that gives away the position and draws fire. By designating only one mortar to fire this type of shell and having it change location after each round we get maximum results with comparative safety."--2d Bn, 120th Inf Regt.

III MACHINE GUNS.

39. Massing .50 caliber guns. "A battery of twelve .50 caliber machine guns was organized for one operation by taking guns from the headquarters, service, antitank, and cannon companies. The commanding officer of the heavy weapons company of the reserve battalion located positions for the guns, assembled the crews, and supervised preparation of the positions. The battery gave direct support to the battalion making the main effort by neutralizing known enemy positions. This fire was effective and permitted the rapid advance of the leading companies. The fire was then lifted to a high ridge which was the regimental objective. When the ridge had been captured, four .50 caliber machine guns were placed on the main line of resistance of each battalion. The fire from these guns helped to break up two enemy counterattacks."--Os of 313th Inf Regt.

40. Fire direction center. "One of our heavy weapons companies during recent defensive operations set up a small machine gun fire direction center. Each squad submitted range cards, and concentrations were consolidated on an overlay which was issued to all units. Each gun had aiming stakes for all concentrations in its sector. Fires were requested by concentration number and a heavy concentration could be furnished quickly."--29th Inf Div.

41. Heavy machine gun on light tripod. "Make sure that all men have fired the heavy machine gun using the light machine gun tripod--we used it oftener than the heavy tripod in the hedgerows."--Platoon Leader, 119th Inf Regt.

IV ROCKET LAUNCHER (BAZOOKA).

42. Getting the most out of the bazooka. "These things will help to develop aggressive and efficient use of the bazooka:

a. "Select aggressive men.

b. "Make the bazooka their primary weapon. Give them only a pistol in addition.

c. "Put bazooka teams for training and operation under a noncommissioned officer who has used a bazooka in battle and believes in it.

d. "Give bazooka personnel special training to include the following:

(1) "Vulnerable points on hostile tanks.

(2) "Emplacing the bazooka to obtain concealment and surprise.

(3) "Tank stalking. This should be by patrols of two bazooka teams and a rifle squad with several submachine guns.

e. "Use your bazookas in pairs under company control unless a special situation makes another method necessary."--Ex O, 334th Inf Regt.

43. Centralizing bazooka control. "One company has consolidated its five bazooka teams into a group with a staff sergeant in charge in order to fix responsibility for getting these important weapons forward. The bazooka men have been armed with a pistol in lieu of a rifle or carbine to lighten their load and increase their feeling that the bazooka is their primary weapon."--All Corps.

44. Reserve bazooka teams. "We hold fresh bazooka teams in reserve, so that when tanks are located the fresh men can be sent forward to engage them. Often the front line bazooka teams are not aggressive enough because of fatigue. We have lost several of these teams because they were too exhausted to use proper tactics. After a tank is stopped, work around to the rear and let him have one, and the tank will normally catch fire."--1st Bn, 11yth Inf Regt.

45. Phosphorus shell. "The white phosphorus bazooka rocket is a honey for clearing haystacks. The Germans hide everything from riflemen and machine gun crews to tanks in haystacks. One white phosphorus bazooka round fires the stack and brings them out."
--CO, 194th Inf Regt.

V THE INFANTRY CANNON.

46. Employment. "We normally give direct support to the regiment and fire under field artillery control only when necessary. Wire communication with our combat team artillery battalion makes it possible for either of us to direct fire for the other. We have a forward observer team with each battalion and have established a fire direction center manned by the company executive officer and an enlisted assistant, who records the data for him."--CO, Cannon Co, 406th Inf Regt.

47. Fire direction center. "Our cannon company fire direction center consists of one 'operations' man, assisted by a telephone or radio operator, and sometimes by the 1st sergeant. The observer reports targets, including coordinates, by telephone or radio to the fire direction center. The gun section is alerted by phone and in the meantime the 'operations' man computes the firing data on an artillery chart. The data is relayed by telephone to the gun section which by then is ready for action."--CO, Cannon Co, 39th Inf Regt.

48. Selection of position. "Positions must be selected that provide a wide sector of fire and permit delivery of close-in fire for the front line. Once a mask which prevented us from firing close-in fires, made necessary a change in positions. We also select our positions so that if counterattacked we can place fire on the area occupied by our front line troops. If much night firing is done, alternate positions must be selected or the enemy will soon locate you."--CO, Cannon Co, 28th Inf Div.

49. Communication for observers. "We supply each forward observer radio operator with two sound-powered phones and a small reel of W-130 wire. This enables the observer to remain at his vantage point while the radio operator transmits from a more suitable position for his radio."--CO, Cannon Co, 399th Inf Regt.

VI MARCHING FIRE.

50. "When employing marching fire we provide a continuous and well distributed volume of fire by having the odd and even numbered men advance alternately. Each group moves forward four or five yards and the men stop, fire to the front, right, and left, while the other group moves forward. The light machine guns are fired from the line on the march. The heavy machine guns deliver fire either overhead or through gaps in the line. We have found marching fire equally valuable in woods and villages and recently used it in capturing a town and over 400 prisoners."--CO, 329th Inf Regt.

VII TIME FIRE WITH RIFLE GRENADES.

51. "We get effective time fire with white phosphorus and fragmentation rifle grenades. A grenade, with the pin in, is placed in the grenade adapter and pushed all the way down on the launcher. As soon as the gunner is ready to fire, the pin is pulled. By inclining the rifle at about a 40 degree angle, a burst at a height of about eight to 10 feet can be obtained at a range of 150 yards."--CO, 1st Bn, 405th Inf Regt.

VIII USE OF 60MM MORTAR SHELL AS RIFLE GRENADE.

52. With grenade adapter M-1. a. "The 60mm mortar shell high explosive may be fired from the M-1 rifle by means of the grenade launcher M-7 and the fragmentation grenade adapter M-1. Six inches of wire per shell and a pair of pliers are the only additional materials needed.

b. "The preparation is as follows: (1) "Remove increments from mortar shell.

(2). "Bend outward the finger of the grenade adapter designed to receive the fragmentation grenade handle.

(3) "Insert the fins of the mortar shell into the fingers of the grenade adapter, thus securing shell to the adapter.

c. "The rifle normally is fired from the kneeling position with the butt resting on the ground. An angle of 45° will give a maximum range of 100 to 110 yards; 60° will give 85 yards range; 70° will give 60 yards range. Low angle fire can also be used and is often fired into thick hedgerow foliage to produce tree bursts. (Note: The safety pin must be pulled before firing.)

d. "Due to the relatively low force exerted by the rifle grenade cartridge, the fuze will sometimes not arm and the shell will be a dud. This is especially true of low-angle fire, which will produce about 25% duds.

e. "Accuracy has been improved by use of a sight improvised by the division ordnance company. It is attached to the stacking swivel and establishes the angle of elevation. Direction is obtained by sighting over the barrel."--Inf Regt.

53. With improvised adapter. a. "We use an improvised adapter with the M-7 launcher and find it more accurate than wiring the mortar shell to a grenade adapter because of the increased steadiness of the shell.

b. "The adapter consists of a metal cylinder about five inches long and open on one end so that it slips over the grenade launcher. On the closed end is a stud which fits snugly into the cartridge well of the 60mm mortar shell. Our ordnance personnel manufactured the adapters from light scrap metal.

c. "Remove the increments and cartridge from the 60mm mortar shell and insert the stud securely into the cartridge well. Place the adapter on the grenade launcher, pull the safety pin and fire. Best results are obtained from the kneeling position with the rifle butt resting on the ground. An angle of 45 degrees will give a maximum range of 125-150 yards."--Cpl A. Mead, Co G, 271st Inf Regt. (Note: The Ordnance Section, European Theater of Operations, in general considers unorthodox employment of ammunition to be dangerous and recommends that such devices be used only in an emergency.)

IX HAND GRENADES.

54. At night. "Whenever possible at night we use hand grenades rather than small arms. Hand grenades don't give away the position."--Sgt Homer A. East, 2d Inf Regt.

55. Hand grenades as booby traps. "An effective booby trap can be made with white phosphorus or fragmentation hand grenades by removing the safety pin, placing the grenade in the container (minus cover) which is anchored to the ground, and attaching a trip wire to the grenade. When the wire is hit, the grenade is pulled from the container and activated."--39th Inf Regt.

56. Protect grenades in defensive positions. "Men should be taught to remove grenades from pockets and put them in handy holes when occupying defensive positions. We have had several exploded when the men were hit."--S-2, 9th Armd Bn.

X KEEP YOUR POWDER DRY.

57. "Have the riflemen check the ammunition they have carried for days. We have had many jams caused by rusty cartridges. This always happens at the critical time."--Sgt R. A. Hawes, 119th Inf Regt.

Chapter Three

OFFENSIVE TACTICS (General)

I TRIPLE POINT FORMATION.

58. "Our battalion used a triple point in the advance. Each point consisted of one scout, one light machine gunner or automatic rifleman and two or three riflemen selected for their aggressiveness. The points were supported by a moving base of fire which included two or three bazooka teams and some men with 60mm mortars without base plates. This moving base was followed by an assault force of a company or a strong platoon which mopped up. The points pushed forward rapidly and when some were stopped the remainder outflanked the opposition. Never were all three points stopped at once. This formation was particularly effective in ditch or hedgerow country where the terrain was compartmented."--Os, 507th Prcht Inf Regt.

II ARTILLERY-INFANTRY COORDINATION.

59. Problem. "The problem of coordinating the infantry advance with the lifting of close-in artillery fire has been solved in several ways but there is general agreement on two points. First, the method used is dependent on the particular situation and such factors as the type of terrain, light conditions, availability of maps, and the degree of training of the infantry in following artillery fire. Second, the method of coordination must be simple and carefully worked out by the artillery and infantry commanders and the information disseminated to all troops.

60. Solutions. "Following are some methods that have been used:

a. "Artillery forward observer informs infantry company commander when last volley is on the way and he informs the platoon leader by SCR 536. This is dependent on all SCR 536s being in good working order and presents the important problem of quickly notifying each man in the platoon.

b. "Firing the last one or two volleys as high bursts (time fire). This is dependent upon time fire not being part of the concentration itself, upon infantry observation not being cut off by trees or hills, and upon absence of trees in the impact area to cause air bursts.

c. "Lifting fire on a closely coordinated time schedule. This is normally practicable only for preparatory fires up to about H plus 10 or H plus 15.

d. "The use of a block of schedule fires modified to fit the actual rate of advance by repeating fires, when necessary, on call. This again presents the problem of notifying all troops of changes in the schedule.

e. "Designation by artillery forward observers of infantry front line locations during the advance, using 1:10,000 maps with fields numbered. This is dependent on having accurate maps available and the time in which to number them.

f. "Firing of colored or white smoke in one of the last two volleys. This has several disadvantages:

(1) "The only easily distinguishable colors--red, violet, and yellow have other important uses. Green is not easily distinguishable, and white is easily confused.

(2) "The enemy can fire white smoke into an artillery concentration.

(3) "Enemy is warned that the concentration is lifting.

(4) "Colored smoke cannot be seen during darkness or at dusk and dawn.

61. Additional aids. "Desirable features in any method include:

a. "If possible, more than one system of warning.

b. "Infantry platoon leaders having their men organized well ahead of time to permit moving forward without delay.

c. "Use of wire to forward platoons when possible."--VIII Corps Os.

III MOVING RAPIDLY BEHIND ARTILLERY.

62. "A battalion which was required to regain the outpost line from which they had been driven turned the trick by timing their advance to make the most of supporting artillery fire. The artillery was asked to place a barrage on the position and notify the battalion one minute before it was to end. The battalion covered most of the last 300 yards to the objective at a run during the last minute of fire and recaptured the line without a scratch."--CO, 312th FA Bn.

IV MIXING UP SUPPORTING FIRES.

63. "We effectively mixed artillery, 81mm and 60mm mortar fires to force the Germans under cover and enable our unit to take a strong hill position with few casualties. Our first artillery concentration on the hill was followed by a considerable pause. Then a second artillery concentration was placed on the same area followed in two minutes by the 81mm mortar fire. This caught a number of Germans coming out of their holes. The mixing continued, interspersed with 60mm mortar concentrations, until it was felt the Jerries would not put their heads up for five to ten minutes after the artillery lifted. When the attack was made the leading unit charged the enemy position immediately after the artillery lifted, and caught the Germans just coming out of their shelters. It required only about 30 seconds to take a number of prisoners."--Co Comdr, France.

V MARCHING FIRE.

64. Most difficult objective. "One assault platoon failed in its mission and suffered the heaviest casualties in the operation when it allowed itself to be pinned down. Another platoon given the most difficult objective in the whole operation, figuratively and literally marched up to its objective and over it because the men kept firing all their weapons, including light machine guns, from the hip. Enemy casualties were twice as heavy here as in any other sector. New men must be made to know that continuous fire on the enemy keeps him pinned down and makes the advance easier."--CO, 309th Inf Regt.

65. Reconnaissance, rapid movement and fire. a. "When an attack is to be made, reconnoiter so that you know what you are up against. Having made your plan, make everybody open fire when the attack starts. Keep shooting as you move and move fast. This applies in wooded and open country equally. The Boche is afraid of our fire power and we do not make sufficient use of it. When you close in rapidly it is difficult for him to adjust artillery and mortar fires on you, especially as you approach his infantry.

b. "Recently one of our companies neglected the reconnaissance phase and walked into an ambush. The company commander ordered and led a bayonet charge and the men moved forward rapidly with fixed bayonets, firing everything they had. The ambush resulted in casualties but they took the position and killed or captured more Boche than their own losses. Rapid movement and heavy fire saved them. Had the company hit the ground and stayed in its exposed position, it would have been annihilated."--CO, 12th Inf Regt.

66. From 500 yards. "Marching fire has saved us casualties by making Jerry keep his head down. When we use it every man begins by firing one full clip or magazine from whatever weapon he is armed with. Company I on one occasion used it against an enemy force which was dug in 500 yards away behind a stone wall. Our troops had to cross a wide open field. The attack was started by a flare signal. On this signal every man came up and fired a full clip and then continued to fire as he advanced. We did not have a casualty and took 400 prisoners whom we found crouched down in their holes, some of them crying. On being questioned they said they could not get their heads up to fire."--Os of 329th Inf.

67. Against houses and pillboxes. "One effect of marching fire in attacking pillboxes and houses is to prevent the enemy from firing from the prepared entrenchments outside."--CO, 330th Inf Regt.

68. In woods. "When attacking woods, we issue each rifleman three or four extra bandoleers of ammunition and form a skirmish line at wide intervals. After the supporting fire has been lifted, the men advance covering the area straight ahead with as much fire as possible. In one instance we were sent in to take an objective which another unit could not take. We used this method, took the objective and had only two men wounded."--CO, Co I, 179th Inf Regt.

69. Against villages and field defenses. "We have lightest casualties in attacks on villages or hasty field defenses when our men employ marching fire as far as 150 yards from the objective.

70. With grenades. "We follow our artillery closely and when it lifts we fire grenades from the hip and try to get air bursts 10 or 12 feet above the ground. BARs spray the area at the same time and we find that this combination of fires is effective in making Jerry keep his head down."--CO, 3d Bn, 405th Inf Regt.

71. Rifle grenades. "When attacking, we put all the rifle grenadiers in the leading wave to increase our marching fire. They fire one white phosphorus grenade to each five fragmentation grenades. Bazookas are used to lob rockets over the heads of the assault waves to create the impression that the artillery is still firing."--120th Inf Regt.

72. You don't have to get all hits. "Remember that a man in a foxhole cannot tell by the crack of a bullet whether it is two inches or 20 feet over his head. Use your firepower to keep the enemy's head down."--36th Inf Div.

73. But arrange for adequate ammunition. a. "Two bandoleers should be issued to every rifleman before an attack to cover needs during reorganization without depending on additional supply.

b. "Every effort must be made to get ammunition forward as soon as the objective is taken. Riflemen often use larger amounts in an attack when employing marching fire and feel insecure if they have only a clip or two left."--Os and EM, 1st Bn, 2d Inf Regt.

VI USE OF SMOKE AGAINST TANKS

74. "When we encounter an enemy tank or self-propelled gun, we cover it with smoke from hand or rifle grenades or bazooka shells. Almost invariably the tank or gun turns and runs or is abandoned by its crew. If it does neither, we close in under the smoke and destroy it."--CO, 120th Inf Regt.

VII NATURAL SMOKE.

75. "Artillery and mortar smoke are invaluable during daylight, but I am a firm believer in the use of 'natural smoke', i.e., the periods of low visibility in early morning and late evening. The enemy fights stubbornly at longer ranges, but his will to fight quickly disappears at the bayonet point. The cheapest way to get from machine gun range to bayonet range is by using the cover of darkness of early morning and late evening mists. I am not referring to a complicated night attack, but to the tactic of using periods of low visibility for approaching enemy positions. My battalion commanders are enthusiastic over this system and find that it lessens the effect of the enemy's mutual supporting fires and prevents early dissipation of our striking force."--CO, 121st Inf Regt.

VIII DUSK ATTACK WITH TANKS.

76. "We attacked at dusk with the infantry following the tanks. It was light enough for our men to see but not for the entrenched enemy to see what was following the tanks. We took the town without difficulty. Reaching the objective just at darkness gave us time to prepare for Jerry's counterattack at daylight."--CO, 1st Bn, 399th Inf Regt.

IX NIGHT ATTACKS.

77. By-passing enemy strong points. "We make gains at night by moving to a well-defined objective, by-passing enemy strong points. We mop up the strong points after daybreak without great difficulty because Jerry is inclined to give up when you get behind him. One or two battalions advance in column along a carefully selected route behind an expert guide and deploy and organize their positions when they have reached the objective. Artillery fires, controlled by phase lines, cover the advance and protect the organization on the objective. Once we were stopped along one route of advance; we withdrew and reached the objective by another route."--CO, 414th Inf Regt.

78. Sometimes surprise is better than artillery. a. "A night attack, preferably just before dawn, is the most effective way to take a limited objective (1,000 to 1,500 yards). One time we jumped off at 0700 hours, without preparatory fires, completely surprising the enemy, and capturing a town quite easily. Surprise was nearly lost, however, when one man accidentally discharged a rifle he had failed to lock. Since then we have allowed sufficient time for each leader to personally check each weapon in his unit before the jump off.

b. "We feel that unless sustained artillery fires can be maintained ahead of the infantry in such attacks we would rather have none at all. Short preparations only serve to alert the enemy."--CO, 3d Bn, 331st Inf Regt.

79. Three successful attacks. a. Night attack over open terrain.

(1) "A strongly held town of over 100 houses was our objective. The enemy held 3,200 yards of open terrain over which our troops had to advance.

(2) "Key personnel made a careful terrain study. Each house was numbered and assigned to a specific unit. Maps containing latest information from interpreted aerial photos were used in planning.

(3) "At 0400 hours the battalion approached the objective in a column of companies. Direction was maintained by compass bearings supplemented by flanking artillery fire and rounds of white phosphorus. The advance through the town was made with two companies abreast. Our casualties in capturing the town were three while the enemy lost 100 killed or wounded and 160 captured.

b. Night river crossing. (1) "Two infantry regiments were to attack supported by the fire of another regiment. Three days and two nights were spent in preparation of detailed plans and orders.

(2) "The attack at 2100 hours was preceded by a one-hour preparation fired by artillery and infantry supporting weapons. Initial crossings were completed by 2235 hours. We suffered 23 casualties, against the enemy's 113.

c. Night capture of a strong point. (1) "The objective, 200 yards away, was a slag pile 80 feet high and 1000 yards on a side, with wooded edges. The exact location of enemy weapons was determined by reconnaissance the day before the attack.

(2) "A half-hour fire preparation preceded the attack of two companies at dusk. The infantry followed supporting fires at 50 yards and seized the objective in 45 minutes. We suffered three casualties and took 93 prisoners."--104th Inf Div.

X PRISONER GUARDS.

80. "Men should be specifically designated to take prisoners to the rear and should be given a definite place to take them. Otherwise half the company will soon be engaged in this work."--Os and EM, 1st Bn, 2d Inf Regt.

XI ANTI-SNIPER INSURANCE

81. "When attacking over a considerable distance we have one man per squad follow at 75--100 yards to protect against by-passed snipers."--CO, Co E, 366th Inf Regt.

Chapter Four

TOWN AND VILLAGE FIGHTING

I TIPS FROM INFANTRYMEN.

Note: The following are views of men of Company I, 357th Inf Regt:

82. Comments of riflemen. a. "The rifleman should fire at any opening to keep the enemy down until he gets inside the building. We used a three-man team in searching rooms--one man with grenades ready to throw at the first sign of occupancy, and two men covering him. Speed is essential."--Pfc Mecozzi.

b. "Every man must know his individual mission. In our attack each man was responsible for a definite objective. When the squad objective has been taken, half of the squad should consolidate the position while the other half returns and mops up. We augmented our armament with every automatic weapon we could get."--Pfc Gottlieb.

c. "Carry plenty of ammunition. We found the following to be sufficient: Three extra bandoleers, four fragmentation and two white phosphorus grenades. When you start, keep moving. Throw grenades into cellar windows but hold them for a few seconds so they cannot be thrown back. Keep contact with adjacent units no matter how small. When the objective is taken, consolidate for a counterattack."--Pfc Bulok.

83. Comments of a BAR man. "The BAR should be in the leading echelon and every likely target should be treated to a generous dose of fire--especially before entering a house. Often there is not sufficient time to get a clear sight picture, but fire must be delivered to cover the riflemen. More training should be given in hip shooting and in the use of the BAR as a close-in weapon."--Pfc Hadash.

84. Comments of an assistant squad leader. "Some of the essentials to success in town fighting are knowledge of the plan of attack, intensive personal reconnaissance, following the supporting artillery fire as closely as possible, speed of movement, and keeping the platoon leader advised of your position."--Sgt Floyd.

85. Comments of squad leaders. a. "The following preparations for an attack will tend to dissipate the feeling of being lost and make the attack almost like a repeat performance: Provide maps and sketches for every man in the platoon and give each a chance to familiarize himself with the area he is going into; let the platoon and squad leaders make as bold and complete a daylight reconnaissance as practicable. Each squad should have an SCR 536. Wire or radio are needed for communication with adjacent units as observation is usually impossible. Hit the enemy hard and fast and don't forget to consolidate after taking a position."--Sgt Almond.

b. "I found it best to split the squad into two or three groups and have each group hit a different building simultaneously. When a building is entered, some of the men should clear it while the others attack the next building. When the objective is taken, a mop-up group should be organized to return and clean out any enemy that have been left hidden in closets and to locate booby traps."--S/Sgt Tardiff.

II TOWN FIGHTING BY PLATOON.

86. Organization and method of advance. "We organize our platoons into two seven-man assault squads and a support squad for house-to-house fighting. The squads move alternately down opposite sides of the street, each clearing its assigned houses under covering fire from the support and the other squad.

87. Procedure and advantages. "Before the assault squads start forward the support squad places fire on the first house, covering all openings thoroughly. A few bazooka rounds are fired into the building. As the firing stops the assault squad rushes the house. The first two men clear the first floor, the second two clear the upper floors, and the third two the cellar. The other man guards the entrance. As soon as the house is cleared the men take up positions near doors and windows to cover the other squad as it clears the first house across the street. When the first two houses have been taken the support moves into them and takes up fire on the third one. This system provides ample fire support for the squad moving forward without exposing too many men at one time."--CO, Co A, 377th Inf Regt.

III MAXIMUM USE OF DISTRIBUTED FIRE.

88. "Each rifleman carried four bandoleers and, as they approached the village, fired at every window, door or other opening. After entering the village, designated men fired straight ahead, others into the buildings on the right and left, while some watched to the rear. Machine guns were emplaced to cover side streets as they were passed by leading elements. Some 31 enemy were killed and 29 prisoners taken without any casualties to our troops."--3d Bn, 180th Inf Regt; 1st Bn, 179th Inf Regt.

IV SECTIONS COVER EACH OTHER.

89. "We organize each rifle platoon into two sections for street fighting--one to assault and the other to cover. Each section has two automatic rifle teams and a bazooka team. All men have several hand and white phosphorus grenades. We attack rapidly and aggressively, clearing each building in the order first floor, second floor, and cellar. Each succeeding building is covered from the top floor of the building just cleared."--CO, 329th Inf Regt.

V BAZOOKAS FOR 'MOUSEHOLING'.

90. "A bazooka fired into the wall of a building makes a hole large enough for a man to enter. Using this system when fighting from house to house overcomes the necessity for inexperienced men to use dynamite charges. Antitank rifle grenades can be used similarly but are less effective."--Ex O, Co G, 119th Inf Regt.

VI PLATOON TO COMPANY WIRE COMMUNICATION.

91. "We maintain wire communications between the platoon and the company command post in town fighting by having the rifle platoon runner, equipped with a sound-powered telephone and a reel of assault wire, follow along with the rear half of the platoon--usually one building behind the leading half. On one occasion when another platoon across the street had its wire blown out, the loose end was tied to a rock and thrown across to us. We simply tied it to our wire and communication was quickly re-established."--Platoon Leader, Co B, 377th Inf Regt.

VII PREVENTING ENEMY REOCCUPATION.

92. "We prevent the enemy from reoccupying buildings abandoned at night for defensive reasons by placing in them charges hooked to electric detonators. These charges can be set off any time the enemy is found to be occupying the buildings. This eliminates the necessity for again fighting for these buildings when the attack is resumed."--1st Sgt B. R. Cotter, Co B, 377th Inf Regt.

VIII A BATTALION ATTACK.

93. General. "Our plans for the attack of a village cover three phases; the assault, the defense of the objective, and the destruction of enemy tanks in the village.

94. The assault plan. a. Preparation. "Careful observation of the objective and a detailed study of aerial photos are carried out prior to drawing up the plan of attack in order to permit assignment of specific tasks. We always employ the following general principles: Attacking towns on a broad front; crossing the line of departure rapidly and gaining the objective under cover of supporting fires; using marching fire; blocking roads and cutting communication lines immediately; clearing the town thoroughly; and organizing quickly after seizing the objective.

b. Execution. "The assault units push all the way through the town beating down the enemy with all available fire on targets and suspected targets. Seizing the objective quickly, they leave the mopping up to support platoons and the reserve company. Catching the enemy between the assault and mopping up groups encourages him to surrender. Bazookas and antitank guns are kept well forward and often fired into buildings. White phosphorus is used to drive the enemy outside.

95. The plan for defense. "We carefully pre-plan the composition of the defensive force and the positions to be occupied after taking the objective. The assault companies take up positions on the edge of town, put out light outposts, and dig in. Initial supporting weapons are the machine guns and 60mm mortars attached to the assault platoons, and the antitank guns. After the first counterattack we complete the dug-in perimeter defense. We do not plan on getting the bulk of the heavy supporting weapons into position until after the first counterattack. This prevents their getting caught half-prepared. The battalion supporting weapons have definite fire missions of which all personnel are informed. We employ a system by which mortar fire can be called for by number. Number one mortar is always laid to fire on number one primary target, number two on number two primary target, etc. When fire is called for on a certain target there is no question as to who delivers it.

96. Knocking out tanks. a. Team composition. "The reserve company is charged with knocking out tanks. We have two 18-man teams organized and trained in each rifle company to be used as tank assault teams. Each team includes an officer leader, a noncommissioned assistant leader, one runner, two two-man bazooka teams, one three-man flame thrower team, four men each with four antitank mines strung on wire 30" apart so they can be drawn across the path of tanks, two men each with bangalore torpedoes and two men with BARs. The leader has an SCR 536. Seven men with rifles or carbines are equipped with grenade launchers for fragmentation or white phosphorus grenades.

b. Employment. "The team employs a series of set operations, any one of which is capable of knocking out the tank. The tank is first smoked; then boxed in with mines under cover of the smoke; fired on by bazookas placed to shoot down on it or to hit the turret; fired on with the flame thrower; and, if the flame thrower fails to ignite, the mixture is squirted on the tank and ignited by a white phosphorus grenade. As a final touch a bangalore torpedo is placed under the tank."--CO, 2d Bn, 120th Inf Regt.

IX TECHNIQUE OF TANK--INFANTRY ATTACK.

97. "We recommend the following procedure: Approach the town indirectly as though going around it. Scout the town and surrounding terrain. Plan a coordinated tank--infantry attack from two directions, aimed to pinch off a part of the town between the prongs of the attack. Designate infantry half-tracks to cover flanks and rear of attacking infantry and

tanks. Use the mortar and machine gun half-tracks to augment the fire of the assaulting infantry. Mount assault infantry on tank decks until forced off by fire. Put a section of tanks on each street. See that riflemen protect tanks from bazookas and act as the eyes of the tanks. Use artillery on routes not covered by the attack to deny them to the enemy."--5th Armd Div.

X TIPS FROM TANKERS.

98. During the approach. a. "Main roads or crossroads near small villages should be avoided as they are often mined and generally have one or more road blocks.

b. "The enemy's first line of defense is usually outside the village. These defenses must not be permitted to separate the tanks and infantry. If the tanks pass them ahead of the infantry, they become subject to short-range antitank fire, and cannot fire at the by-passed enemy without endangering our own troops.

c. "A base of fire should be formed with tanks and other direct fire weapons, while additional tanks encircle the village and attack from the flanks.

d. "When infantry are carried on tanks, they should dismount before entering a village. However, in one night attack, the infantry remained on the tanks and fired at enemy on roof tops and in upper stories of buildings.

99. Within the village. a. "It is not necessary for infantry to precede the tanks into small villages, but they should remain abreast of or close behind them to provide antitank protection.

b. "If more than one street is available, parallel attacks should be made. Narrow streets should be avoided, as only the fire power of the leading tank can be employed in them.

c. "Hand grenades were found to be of great value as tank commanders could throw them through windows without leaving the tank, and sometimes cause the enemy to evacuate buildings. This conserves tank ammunition and is less dangerous to our infantry than use of the tank weapons.

d. "White phosphorus can be of great value in village fighting but a definite plan for its use must be made before the attack begins, and explained to all elements. White phosphorus rounds should hit in or behind buildings. If they hit in front the enemy can escape in the smoke without being seen. A round of white phosphorus will usually cause the enemy to surrender or leave the building.

100. After the attack. "Both infantry and tanks should move out of a village as soon as it has been taken, to avoid mortar and artillery fire."--Os and men, 70th Tank Bn.

101. Tanks abreast. "In villages we employ tanks abreast if the streets are wide enough. The right tank covers the buildings on the left and vice versa. The tanks then do not have a blind side as they do when they operate singly."--CO, 48th Tk Bn.

102. Ammunition reserve. "Each infantry platoon in village fighting should have two tanks in active support and two others in reserve. When the active tanks have expended half of their ammunition, they should be replaced by the reserves. The relieved tanks can then replenish their ammunition immediately or follow along until a lull occurs. This system gives added flexibility in case it becomes necessary to make a sudden push or to repel a counterattack."--736th Tk Bn.

XI ARMORED INFANTRY.

103. When assaulting villages we have a rifle squad in a half-track follow each tank at about twenty-five yards, rather than have the infantry ride on the tanks. The advantages are that a complete, organized squad is available to go into action, and that the

infantry does not have to dismount every time the tank halts to fire during the approach. Also, the ability of the half-track to maneuver in rear of the tank affords the infantry some protection against enemy small arms fire. We had fewer casualties among infantry when riding in half-tracks than when riding on the tanks."--CO, 10th Tk Bn.

XII SHOCK ASSAULT.

104. "Where resistance has been weak and we can employ tanks on the flank or rear of the town, we mount a squad with many automatic weapons on each tank and charge into the town with all guns blazing. All supporting fires are also used and the surprise and shock often result in the enemy giving up without a fight. The remainder of the rifle company follows on foot and assists in mopping up."--CO, 3rd Bn, 378th Inf Regt.

XIII COORDINATING TANK FIRE.

105. "Definitely assign one tank to fire on the lower floors and another to fire on the upper stories of enemy-held houses when a tank section is working with infantry in streets. Firing should be on prearranged signal. This coordination will avoid confusion and prevent casualties to our own troops."--Sgt J. C. McComb, Co E, 377th Inf Regt.

XIV NIGHT ATTACK WITH TANKS.

106. "We employed a platoon of tanks with each of two infantry battalions in a successful night attack in a town. The infantry secured the houses in the edge of town before dark. After dark the tanks moved up and worked with the infantry as in a daylight attack. Generally, one street was worked at a time, the tanks moving in the center of the leading infantry wave and knocking out machine guns or other weapons holding up the advance. The muzzle flash made easy the location of hostile machine guns. Action was controlled by means of telephones on the tanks. The town was taken by 0300 hours with but 12 men wounded in the two battalions and no casualties to tanks or tankers."--CO, 137th Inf Regt.

XV SURPRISE ASSAULT WITH INCENDIARIES.

107. "We used an unusual plan to take a small town of about thirty stone buildings near Nancy. Ten battalions of artillery placed three rounds on the town and then smoked the area. Under cover of the smoke a company of medium tanks moved in on each flank and fired into the houses. Then the infantry dashed through the town throwing incendiary grenades into the windows, and dashed out again. Shortly, every house was burning and the Germans who had probably been in the cellars began to run out. We killed or captured about 300."--CO, Combat Command, 7th Armd Div.

XVI INDICATION OF DEFENDED VILLAGE.

108. "If we approached a village and saw the citizens proceeding with normal daily routines we felt sure the enemy was not defending. If the people were indoors and quiet, it was a sure indication the enemy was prepared to defend."--CO, CCB, 5th Armd Div.

XVII DON'T GET TRAPPED.

109. "Never retreat to a cellar no matter how hot it gets--you may become trapped. When using cellars for shelter always leave men upstairs to observe and warn of approaching enemy."--Sgt J. C. McComb, Co E, 377th Inf Regt.

Chapter Five

FIGHTING IN CITIES

I STREET FIGHTING IN BREST.

Note: The experiences below were those of the 2d Infantry Division and other units of the VIII Corps.

110. Enemy defense methods. a. "Streets were covered normally by grazing fire of automatic weapons located in pillboxes and in basements. Pillboxes were located frequently at street intersections. Machine gun bullets fired from upper stories produced effective ricochet fire.

b. "Riflemen were placed both in upper stories and in many gutted buildings, small holes having been made in the remaining walls to enable fire to be placed in the centers of blocks.

c. "Buildings within the interior of a block normally were not occupied as they did not afford fields of fire and were easily surrounded.

d. "Direct fire weapons were kept at some distance and were used mainly to fire at upper stories, in many cases denying the use of upper stories to artillery observers.

e. "A large number of tunnels and underground installations were used as protective shelters, storerooms, or repair shops. Entrances to these shelters often were defended.

f. "Buildings were set afire frequently in order to block the advance of attacking units. After the buildings had burned out the additional open space gave the defenders improved fields of fire.

111. Boundaries and zones of action. a. "Streets formed the boundaries between units. In some cases the entire street was included within the zone of a unit; in other cases the boundaries were drawn down the middle of the street. Many felt that the responsibility for the street was immaterial, since no one dared use it.

b. "Widths of zones of action were reduced due to the height and depth of the area to be neutralized and captured. Company zones varied between one and two block fronts with each platoon assigned a row or block of buildings.

c. "Where the near side of a city block was held, one unit (squad or platoon) was assigned the group of buildings on each side of the block, while a third unit remained on the friendly side of the block to give support by fire into the windows of the buildings on either side. Such support was very necessary. If only two units were available one would remain to support by fire. The blocks usually formed a hollow square of buildings across the center of which the supporting fire was delivered. Bazookas, BARs, tommy guns and the submachine gun were effective for such support.

d. "It was found desirable to attack with two companies abreast, with the reserve company held much closer to the assault units than in open terrain. The reserve company could deal with local counterattacks rapidly and could prevent infiltration in rear of the assault units.

e. "To insure maintaining a continuous front, each squad and platoon coordinated with the next higher unit after securing an objective. However, uniform progress along a line was not necessary and unequal progress resulted in many opportunities for flanking movements.

112. Demolitions. a. "Because the streets were so heavily defended, the buildings provided the routes of advance. Entry was gained by blasting holes through covered sides of walls. In some cases, demolition teams with prepared charges were attached to each assault platoon; in other cases, engineers prepared and furnished the charges and the infantry executed the demolitions.

b. "Pole and satchel charges generally were used but care was necessary in determining the amount of the charge since it was difficult to estimate the thickness of the walls. In a few cases, a too heavy charge brought the entire building down into its basement, forming an obstacle. Our men were not injured in these cases, since they would always be two or three buildings back at the time of the explosion. One solution to this problem was to place the charge in a fireplace where the heavier side walls of the fireplace would prevent collapse of the walls.

c. "Ammunition and pioneer men were at a premium as advance was limited by the number of demolition teams available. The front line troops joined with the men from the ammunition and pioneer platoons to form demolition teams. One unit reported that when the ammunition and pioneer platoon sent down a four-man team, four three-man teams were formed, using one ammunition and pioneer man in each.

113. Method of advance. a. "After a hole had been blasted, a rifle squad or half-squad made an assault through the hole before the enemy could recover from the shock. Once a building was entered, each floor had to be cleared in turn.

b. "Some units found it best to enter a building from the roof or top floor and work down. Scaling ladders were invaluable for entering through windows and ceilings. One platoon leader, however, felt that it was better to enter the lower floors of buildings for, if necessary, the building could be burned from the bottom; conversely, the enemy could do the same if our troops were above. The platoon leader also found that, when the ground floor was captured, a few armor-piercing shots from the M-1 or BAR through the floors would usually bring the enemy down with their hands up. When the enemy held out in the basement, a well-tamped charge of TNT on the floor above usually was effective.

c. "It was found best to cross streets near the center of blocks. To make sure that the doors of buildings across the street were open, the locks were shot away or the doors blasted open with bazookas or antitank grenades. The street was then filled with smoke from hand grenades and the men dashed across under its cover. Enemy automatic weapons sometimes could be located when they fired at the smoke.

114. Time of operations. a. "Experience showed that advances could be initiated any time after daylight, the hours of darkness being used to blast holes in initial objectives for the following day.

b. "Three or four hours sometimes were necessary for consolidation of positions for the night. This was found desirable to enable units to prepare positions to cover every enemy approach. Without this coordinated defense for the night, the enemy infiltrated riflemen behind advance elements and seriously hampered operations on the following morning.

115. Supporting artillery. a. "Close artillery support from organic howitzers was of little value due to the varying heights of buildings and to the very close contact with the enemy.

b. "Artillery rendered invaluable support in engaging targets some distance ahead of front line units and in placing an intense 24-hour program of harassing and interdiction fires on selected areas and targets in the enemy's rear.

c. "Tank destroyer weapons and 155mm self-propelled guns, sometimes firing at ranges of only 500 to 600 yards, helped neutralize or destroy heavy emplacements, pillboxes, heavily defended buildings and strong points. These weapons also provided avenues of advance for units by blasting walls of buildings. The following points are of interest in the employment of these weapons:

(1) "A liaison officer or noncommissioned officer should remain with the rifle company commander at all times to speed delivery of fire.

(2) "Guides should be furnished to lead the weapons into positions and to point out targets.

(3) "The weapons must be protected against enemy antitank weapons.

(4) "Weapons should follow front line units by bounds when not employed.

(5) "Mortar or artillery fire should be used to conceal the noise of weapons moving to positions.

(6) "Normally one section of tank destroyers was attached to each assault company.

(7) "Subordinate and adjacent units should be informed when these weapons are to fire.

116. Chemical mortars. "The 4.2 chemical mortar was one of the most effective supporting weapons. It was able to shoot over high buildings and to render support within 100 yards of front line elements. Large amounts of white phosphorus were used to drive the enemy out of cellars and buildings into the range of rifles and automatic weapons.

117. Infantry weapons. a. "The most effective automatic arms employed were BARs, Thompson submachine guns, and carbines modified for automatic fire.

b. "Heavy machine guns furnished little support due to limited fields of fire. They were normally used to cover streets leading into the flanks, and where possible, to fire down streets to the front to prevent the enemy from crossing streets and shifting positions.

c. "Rocket launchers were profitably employed when it was possible to advance within range. They were effective in clearing out machine gun positions in houses and pillboxes.

d. "57mm antitank guns were held near street corners in ready positions from which they could go into firing position rapidly, fire and withdraw.

e. "60mm mortars were used on close-in targets, and were effective in keeping enemy riflemen from roofs or top floors of buildings. They were of more value in residential districts than in solid blocks of high buildings, but in both cases were helpful in fixing the enemy and in preventing his movement to new firing positions. The 60mm mortar shell launched from rifles (see chapter 10) was extensively used for direct fire through windows.

f. "81mm mortars provided excellent support at ranges not to exceed 1500 yards. Displacement was normally by section as suitable areas for platoon positions were rare. White phosphorus ammunition was used extensively for screening and for casualty effect, and high explosive (both light and heavy) for destruction of buildings. Buildings were set afire with 81mm white phosphorus shells, but only as a last resort because this left a difficult obstacle. Such fires were set at night so as not to interfere with daylight combat.

g. "Hand grenades (fragmentation and white phosphorus) were essential for clearing out basements, houses, and pillboxes.

h. "Flame throwers were used in several instances when direct fire weapons could not be employed and often resulted in a quick enemy surrender.

118. Ammunition supply. "Company supply dumps were maintained one block in rear of assault units, because front line units could not normally carry a full day's supply.

119. Communications. a. "SCR 536 radios were of little value, because transmission and reception in buildings were not good.

b. "Communication with platoons was maintained by sound-powered telephone.

120. Relief of units. "One company commander recommended that the relief of a forward company be accomplished in daylight. He pointed out that routes forward led through basements, around buildings, through holes in walls, and over half-demolished walls. If men were brought to their stations during darkness, they had no idea what they were guarding against.

121. Mine clearing. "Mine detecting personnel from ammunition and pioneer platoons and from combat engineers followed the assault closely in order to clear routes of advance for tank destroyer and antitank weapons.

122. Aerial photographs. "There was a uniform desire for aerial photographs in quantity and it was pointed out that they should be taken almost daily in city fighting to provide accurate information as to which buildings remain.

123. Engineers. "Engineer troops assisted in the following roles:

a. "Gapping walls, floors or ceilings to permit infantry units to advance.

b. "Clearing routes and preparing positions for self-propelled weapons. This often was accomplished during hours of darkness with hand tools, to avoid disclosing positions.

c. "Filling craters with rubble from destroyed buildings.

d. "Filling numerous antitank ditches by placing explosives inside walls of adjacent buildings in such a manner that the debris was blown into the ditches. This was found to be much faster than blowing in the shoulders of ditches, due to rock and hard surfaced roads.

e. "Checking streets for mines. Some mines were found under regularly spaced removable concrete squares. These concrete blocks were not camouflaged and normally would be presumed to cover slots for holding steel roadblocks.

f. "Cutting steel roadblocks with TNT. This was found to be the quickest and safest method.

124. Conclusions. "The following conclusions were reached as a result of the operation:

a. "Greatly increased initiative is required of squad and platoon leaders, because the capture of each city block and group of buildings is a distinct operation in itself.

b. "Narrow zones of action are imperative.

c. "Interiors of city blocks, rather than defended streets, provide best avenues of advance.

d. "Consolidation of positions prior to darkness is necessary to prevent enemy infiltration during the night.

e. "Close artillery howitzer support is normally impracticable.

f. "Direct fire artillery, antitank weapons, mortars, grenades, flame throwers, and light automatic weapons are most effective.

g. "SCR 536 radios are unsatisfactory when used in buildings.

h. "Engineer troops are invaluable in clearing routes and accomplishing demolitions."

II STREET FIGHTING IN AACHEN.

125. Reasons for success. "The commanding officer of a regiment which fought through Aachen attributed his success to several factors:

a. "All available fire power, common sense, and normal tactical principles were employed.

b. "The operation was not unduly hurried; it was realized that street fighting is a slow, tedious process which requires much physical exertion and time if buildings are searched thoroughly.

c. "The enemy was forced to fight on our terms. At every opportunity we would attack from the direction he least expected. We would first isolate a small section, then leave a small holding group, and work around to the rear.

126. Value of mopping up thoroughly. "At no time during the operation did the enemy fire a shot from behind our lines. To accomplish this, every room and closet of every building was searched and every sewer was blown. It paid dividends because fighting troops didn't have to fear being sniped at from the rear, and command and supply personnel functioned more efficiently.

127. Supporting weapons. "To avoid detection we put the tank destroyers and self-propelled guns into position just before daylight or at dusk. We had the engineers and the pioneer platoon blow a hole in the near wall of a building. We then ran the gun through this hole into the building and fired through another hole in the opposite wall just large enough for the gun barrel."--CO, 26th Inf Regt.

128. Maximum fire power. "I learned to use the fire power of every available weapon in the Aachen fighting. We took one strongly held position without a single casualty by laying an artillery barrage, a closer-in mortar barrage, and having every man in the assault wave throw a grenade as the fire lifted and the assault started.

129. Infantry--tank coordination. "We kept the tanks and tank destroyers well forward, usually one to a street. Four infantrymen were assigned to protect each vehicle from bazookas and other antitank weapons."--Bn CO, 26th Inf Regt.

III LOCATING ENEMY WEAPONS.

130. "Usually we proceeded from house to house by 'mouseholing'. When there was an open space between houses, or a street to be crossed, we would simulate an attack on one house by using smoke grenades and firing bazookas into the objective. Bazookas and rifle grenades were also used to blast open the doors of the buildings in the vicinity of those we intended to enter. At the same time we would fire rifles and BARs at all likely supporting positions. When all this fire broke loose, the enemy usually opened up with their defensive fires, thus permitting us to determine their strength and dispositions in that locality. We would then neutralize the known points of support and attack rapidly across the open ground."--CO, 3d Bn, 378th Inf Regt.

IV ENEMY ESCAPE ROUTES.

131. "We found that the enemy moved from basement to basement through connecting doors and holes. They also had tunnelled avenues of escape from basements to other organized areas."--104th Inf Div.

V WEAPONS EMPLOYMENT.

132. Firing into buildings. "Our tanks start firing into the ground floor of buildings occupied by the enemy and work up to the top floor. This forces the enemy to go into the basement, where our infantry can move in and trap him, or to occupy a higher floor where the fire will eventually catch him."--Lt, 750th Tk Bn.

133. Use of antitank grenades against personnel. "We used antitank grenades effectively against personnel in town fighting. When we heard the Germans coming up the street in the dark we fired at the sound, bouncing the grenades off the pavement and the walls of buildings. We found a number of dead Germans in the street the next morning."--Lt, 110th Inf Regt.

Chapter Six

W O O D S F I G H T I N G

NOTE: All material in this chapter was received from the 3rd, 4th, 78th, and 79th Infantry Divisions.

134. Organization. "Each assault rifle company may be organized into two assault groups and two support groups. The assault groups are armed only with hand weapons and grenades. They normally advance in column preceded by scouts. The support group follows its assault group within the limit of visibility, provides flank protection, and gives support with 60mm mortars and light machine guns. Reserve groups should be held far enough to the rear to insure against their becoming involved in the fight of the assault companies. They are employed in localities where the advance is successful. When employed, they should be furnished guides and moved rapidly over previously reconnoitered routes.

135. Control. a. "Individuals are designated in each assault group to maintain direction by compass.

b. "Each assault group keeps in communication with the company commander by laying a wire line as it advances. This ties the assault groups together and provides a route for runners, ammunition carriers and litter bearers. The distance advanced can be determined easily if the wire line is tagged every 100 yards prior to starting.

c. "We cut and mark an alternate route from the battalion to the company command post. Enemy shelling often obliterates the original path and runners are likely to become lost. One of two paths will usually escape the enemy barrage.

136. Roads and trails. "Regimental zones should include all roads and trails which offer the enemy easy entrance into the area. In order to fix responsibility for clearing roads and trails, units should advance astride them, rather than use them as boundaries. One unit considers it best, when advancing along a road or trail, to use a series of small encircling movements, closing in on the road every few hundred yards. Clearing these avenues of enemy often is essential to supply and evacuation due to the density of the remainder of the forest.

137. Advance with small arms fire. "Leading elements should continue advancing until stopped by effective enemy fire. They must be trained not to let the unaimed fire of hostile weapons stop them but rather to fire in the general direction from which it is coming and keep moving.

138. Precautions against losses. a. "Roads, trails, clearings and buildings are generally dangerous because they usually are included in the enemy's prepared fire plan.

b. "Overhead cover should be provided whenever possible. When halting temporarily each man should get close to a large tree as this affords some protection from both tree and ground bursts. The danger from tree bursts is somewhat offset by the enemy's lack of observation.

c. "When fighting for limited objectives we cut and pile a stack of logs near the line of departure. These can be brought forward quickly to provide overhead cover for newly-dug foxholes.

d. "Don't stop at the edge of a clearing or where different types of trees meet. The enemy adjusts accurately on any clearly outlined area.

e. "Don't stop at the edge of a minefield in woods. Enemy artillery and mortars usually are zeroed in on them. If you can't go forward or around, pull back at least 250 yards.

f. "Enemy action can be expected from any direction. Too many men--particularly reinforcements--look for the enemy in one direction only.

139. Small arms. "Heavy fire power at short ranges is best furnished by hand and rifle grenades, bazookas, BARs and submachine guns. Grenades are needed in large quantities. Each rifleman should have a grenade launcher. Several submachine guns in place of M-1 rifles in a rifle squad enable a few men to lay down heavy, sweeping fire. The BAR can effectively cover trails and other approaches during enemy counterattacks. Squad leaders should also have flare pistols for designating enemy positions.

140. Antitank guns. "Enemy counterattacks can be expected along the routes through which his reserve armor can be employed. Antitank guns should be leap-frogged forward to cover these probable routes of approach and not held in reserve coupled to their prime movers. Antitank guns should be emplaced so as to permit firing while under artillery or mortar fire themselves.

141. Light tanks. "Light tanks can be used effectively to support an assault group after contact has been made. Time must be allowed for orientation of the tank platoon leaders, and reconnaissance and marking of the tank route to the area from which the assault is to be made. The tanks lead the assault, closely followed by the assault group. All tank weapons are fired and the accompanying infantry use assault fire, advancing rapidly and making as much noise as possible. Each tank platoon has attached to it one infantry squad, one engineer mine removal squad, and a bazooka team. A telephone on the rear of each tank permits the squad leader to make contact with the tank commander. Targets are then pointed out with tracer rifle fire. Prearranged pyrotechnic and smoke signals or hand and arm signals also may be used.

142. Tanks and tank destroyers. "We have used tanks and tank destroyers in woods, both on and off roads. They need some terrain feature to guide on and reasonably firm ground. The sound of our tanks has a demoralizing effect on the enemy.

143. Enemy positions. a. "Concrete fortifications encountered by assault groups should be contained by minimum personnel and a special task force with the means for reduction sent forward.

b. "Clearings and fire breaks are usually strongly organized and should be given special consideration.

c. "In woods, most anti-personnel minefields can be by-passed. Except when the enemy is in a line of bunkers, dense minefields are seldom more than 100 yards long.

144. Emerging from woods. "Prior to debouchment supporting weapons must be brought up, a suitable formation adopted, and arrangements made for artillery fire. These steps should be taken before reaching the edge of the woods. The exit from the woods may be made rapidly or by infiltration, depending upon the amount of fire encountered. Scouts should precede the debouchment by at least 500 yards or as far as the next terrain mask.

145. White phosphorus and chemical mortars. "White phosphorus and 4.2 chemical mortars were very effective.

146. Stopping counterattacks. a. "Mortars and small arms fire are most effective in stopping infantry counterattacks. Mortars, due to their high trajectory, have many

advantages over artillery. Troops must concentrate small arms fires on suspected enemy localities when a counterattack threatens because observed targets are seldom found. Prisoners stated that our mortars and small arms caused the most casualties in their counter-attacks.

b. "When the enemy is known or suspected to be preparing a counterattack, concerted fire to the front by all weapons at prearranged intervals will often break up his plans. This entails the possibility of giving away our locations, but the enemy is usually well aware of our approximate location after he has made one or two counterattacks.

147. Communications. a. Wire. "Wire should be laid to assault companies as they advance, but away from roads or trails that may later become supply routes. Protection must be given to wire parties.

b. Radio. "All radio sets have reduced range in heavy woods. An alternate operator with each set should be provided to replace casualties. Security must be especially stressed. In one case the battalion commander's party was brought under heavy mortar fire and two members killed because he stated over the radio in the clear, 'I am returning in a half hour'. The enemy covered the only route to the rear with mortar fire."

Chapter Seven

REDUCTION OF FORTIFICATIONS

I TRAINING.

148. "When we came to attack the Siegfried line we found that our previously trained assault detachments had become casualties. After that we trained all personnel with all weapons. Then, when a casualty occurred, the nearest man could pick up the weapon and do the job."--Bn CO, 117th Inf Regt.

II PRELIMINARY FIRES.

149. "I have used the fires of 81mm mortars against enemy pillboxes. Mortar shells exploded many mines by sympathetic detonation, and also made craters which gave protection to our troops against enemy fire."--CO, 18th Inf Regt.

III WEAPONS.

150. General rules. "One regiment found the following general rules applicable:

a. "Pole or satchel charges must contain at least 30 pounds of TNT.

b. "Assault teams cannot be given specific pillboxes but must be prepared to take whatever pillboxes are in their zones. This is because maps do not show all pillboxes.

c. "Self-propelled tank destroyers are especially valuable for firing on pillboxes beyond those under immediate attack. Towed tank destroyers and antitank guns are of less use due to enemy artillery and mortar fire.

d. "Light artillery has no effect on pillboxes, but time fire drives personnel around them inside.

e. "The flame thrower is used very little. In most cases the men carrying it are not able to get within range."--28th Inf Div.

151. A special artillery formula. "Mixing 105mm and 240mm howitzer fires proved an effective way to reduce a troublesome pillbox. The light battalion adjusted on the pillbox, passed the data on to the heavy battalion, then stood by for a time-on-target shoot. The 240's fired a few rounds for adjustment using quick fuzes, then changed to concrete-piercing T-105 fuzes, which caused the Germans to leave the pillbox. As they came out, the 105mm time-on-target shoot caught them and inflicted heavy casualties."--Arty Ex O, XV Corps.

152. White phosphorus. "When a pillbox is breached, we sometimes fire a round of white phosphorus into it before the infantry assault. The enemy cannot recover quickly from the effect of the white phosphorus, and our troops have time to reach the pillbox." --CO, 1st Bn, 18th Inf Regt.

IV ORGANIZATION AND COORDINATION.

153. Each pillbox a phase line. "We use a 12 to 16 man assault team. Each man must know his weapon and job, plus the weapon and job of everyone else in the team (flame thrower, demolition charge, rocket launcher, etc). We sometimes assign each rifle platoon a fixed zone of responsibility. Each pillbox becomes a phase line for coordination and reorganization. In many instances one platoon can cause two or three pillboxes to 'button up' by firing at the embrasures, but the enemy often can continue to fire through small

slits in the embrasure. Men must not forget that pillboxes are mutually supporting. Include in your plan fire on flanking pillboxes as well as on those to be assaulted.

154. Coordination of fires. "The supporting direct fire weapons should cease fire on pillbox apertures without signal when the infantry comes within 25 yards of the pillbox. The infantrymen nearest the aperture immediately open fire to keep it closed. Two flanking groups of three or four men each take position in rear of the pillbox to cover the rear entrance and apertures. The support squad looks for, and covers with fire, the embrasures in the pillboxes which are sited to support the pillbox being attacked. The rest of the company or platoon move past the pillbox and secure the ground beyond it to protect the assault team while it does its job."--28th Inf Div.

155. Night assaults. "Successful night assaults on pillboxes were made using the following plan: Assault groups consisted of a demolition party of two or three men with three 12-pound satchel charges of composition 'C', and six to 10 men armed with rifles, antitank grenades, submachine guns and automatic rifles. Assault group leaders studied the terrain and the pillboxes in daylight, selected routes and recorded azimuths. Just before the assault, time fire was placed on a number of bunkers, including the ones to be attacked. This drove the enemy inside without indicating exactly which bunkers were to be assaulted. The assault group used antitank grenades and other fires to kill guards and button up the bunkers. Men climbed on top of each pillbox, and with a cord, swung a satchel charge into the entrance. As soon as it exploded another satchel charge was thrown into the entrance corridor. In every case this brought the Jerries out."--CO, 1st Bn. 378th Inf.

156. Teamwork. "We used small teams of tanks, tank destroyers and infantry to capture pillboxes. The infantry moved forward until held up by a pillbox. The tanks would then come up and close the aperture with machine gun fire while the tank destroyers fired several rounds of 90mm into the fortification. When the infantry started for the pillbox again, the enemy usually surrendered. We had adopted this close formation because of limited routes of approach, poor visibility, and uncertainty as to pillbox locations, but it proved so effective we were able to clean out an entire fortified town in one day."--610th TD Bn.

V ACTION AFTER THE ASSAULT.

157. Surrender precaution. "If the enemy surrenders do not forget to keep the pillbox covered and throw a grenade in each room before entering; there may be some men who didn't come out.

158. Digging them out. "If the enemy does not surrender, some men must work to the blind side of the pillbox and blow the embrasure with TNT. After this, it is best to work from the top to place a pole charge against the door. Never allow anyone to enter the excavated area to the rear of the pillbox as it is always covered by a small embrasure built especially for that purpose. Under no circumstances allow anyone to enter the pillbox to take prisoners; make them come to you. Sometimes they will claim to be injured, but we have found that after a second charge of TNT they somehow manage to walk out. When approaching these pillboxes all persons should be warned against mines.

159. Destroy pillboxes completely. "Pillboxes should be demolished immediately after capture to prevent their being occupied. Blowing of the aperture and doors does not make the pillbox untenable. It has to be completely destroyed, right down to the ground. One wall left standing leaves a place to fight from. Someone should follow close behind the

assault with the equipment to completely destroy the pillboxes."--28th Inf Div.

160. One method of demolition. "We found that pillboxes could be demolished by using a 35-pound beehive charge to blow a hole in the concrete and then packing the resulting hole with composition 'C'. When this is set off the pillbox disappears."--CO, 320th Engr Bn. (C).

161. Prepare for enemy fire and counterattack. "After the pillbox is taken everyone must deploy to the front and flank to guard against counterattack and be prepared for the rain of mortar and artillery fire that always follows. Don't bunch up around prisoners. Send most of them to the rear as quickly as possible, because we have had the enemy shoot his own men to prevent their capture."--28th Inf Div.

VI EXAMPLE OF FLEXIBLE TACTICS.

162. Composition, strength and organization. "We once used a force consisting mainly of tanks, with one infantry company at greatly reduced strength supporting each tank battalion. Each tank battalion had about 35 medium tanks. Each battalion was organized into two composite companies. Tank dozers were attached to the assault companies and all available assault guns were placed in positions permitting direct fire support.

163. Plan and operation. "The general plan of attack was for the tanks to assault a position, gain fire superiority and for the infantry then to move in and occupy the position until a tank dozer had covered the embrasures and entrances to the pillbox. In four days of operation 49 pillboxes were buried and an additional eight were captured by the task forces and destroyed by engineers.

164. Hostile countermeasures. "After a time, the enemy modified his tactics to meet our methods with increasing effectiveness. He mined the ground in front of embrasures and entrances and stationed bazooka men in foxholes around the pillboxes and in some cases on top of the pillboxes.

165. We change our tactics. "Plans were then drawn up for a coordinated attack by two infantry companies, a reinforced tank company, and engineers working in teams on a group of pillboxes about 2,000 meters from the location of the previous attack."--3d Armd Gp.

Chapter Eight

RIVER CROSSING EXPERIENCES

I SECRECY AND SURPRISE.

166. "Secrecy and surprise were of great importance even in bold and hasty crossings. In a number of instances, the speed of the attack was a principal factor in obtaining decisive surprise. Other methods used to contribute to secrecy and surprise are listed below:

a. "In the Moselle crossing by the 80th Division:

(1) "Minimum reconnaissance parties, carefully concealed.

(2) "All preparatory movements made under cover of darkness.

(3) "Artillery fires for several nights prior to the attack generally similar in nature to those planned for the attack proper.

b. "In the crossing of the Seille by the 317th Infantry Regiment: Executing the crossing at a time when conditions were extremely unfavorable due to excessive rains and flood.

c. "In a river crossing in Holland by the 104th Infantry Division:

(1) "By the selection of crossing sites as follows:

(a) "One opposite a small town which it was thought the enemy would regard as an unlikely selection.

(b) "One where an earlier small bridgehead had been driven back across the river and at which it was felt a second crossing would not be expected.

(c) "A third unlikely site commanded by a row of houses on the far shore.

(2) "Making a feint in another area at what appeared to be a favorable crossing site." --Consolidated Report on River Crossings.

II A SUCCESSFUL BATTALION CROSSING.

167. Crossing. "Prior to crossing we had all boats lined up and numbered from right to left. The entire battalion crossed in two waves, 10 minutes apart, on a two-company front.

168. Precautions against mines. a. "We had carefully studied the terrain on the far bank and had located some minefields. Each man cut a small willow switch which he pushed along in front of him to locate trip wires.

b. "We also used 48 primacord mats, made up by the engineers who had found them to be 100% effective against Schu-mines. The mats were 15 feet long and 14 feet wide with an 8" mesh, and weighed less than 8 pounds. Each mat had a 10 second fuze. The mats were carried rolled up like rugs. When a minefield was encountered the mat would be rolled out and detonated, clearing a path 4 by 15 feet.

169. Individual weapons. "Each man was required to load and lock his piece before crossing. Only designated men were to fire if we were attacked. Bayonets and grenades were to be used to overcome resistance.

170. Antitank protection. "We formed five three-man bazooka teams from our antitank platoon. We also had each rifle company and the ammunition and pioneer platoon carry 25 antitank mines.

171. Ammunition supply. "Ten men from each rifle company were attached to the ammunition and pioneer platoon to assist in getting ammunition across the river. The ammunition had been prepared in 50-pound packboard loads. It was carried from the battalion dump on the near side to boats which were pulled back and forth across the river by ropes. Two boats were assigned for this purpose.

172. Aid stations. "The regular aid station was established on the near side of the river, and an improvised traveling aid station was set up on the far side about 200 yards from the crossing site. A fourth litter squad was formed under direction of a medical technician, and two squads were sent with the station on the far side. Forward collecting points were set up in houses along the route of advance. Two boats were used to evacuate casualties across the river."--CO, 1st Bn, 407th Inf Regt.

III REGIMENTAL SUPPLY AND EVACUATION.

173. Individual loads. "Each man ate a K ration meal on the near bank and carried four additional meals--three of K rations and one of D ration. Each rifleman carried a belt of ammunition and two bandoleers. Automatic weapons teams carried all the ammunition they could.

174. Forward dumps and carrying parties. a. "Each assault battalion established a forward dump on the near shore several days before the crossing. Rations and water for one day and the following amounts of ammunition were placed in each of the dumps: Carbine --3,000; M-1 rifle--15,000; .30 caliber machine gun--15,000; 60mm high explosive--400; 60mm illuminating--50; 81mm heavy--50; 81mm smoke--50; bazooka--75; bazooka white phosphorus --25; antitank rifle grenade--100; white phosphorus rifle grenade--30; fragmentation hand grenade--300; smoke grenade--20.

b. "Carrying parties were organized from ammunition and pioneer platoons. Supplies were carried across by packboard on D-Day and D plus one. Each man made about 50 trips.

175. Vehicle loads. a. "One ¼-ton truck and trailer for each company was loaded with five cans of water, five cases of K rations and the following amounts of ammunition: Carbine--250; M-1 rifle--1,000; .30 caliber machine gun--1,500; .45 caliber--600; 60mm high explosive--48; 81mm light--45; 81mm smoke--5; bazooka--10; antitank rifle grenades--12; fragmentation hand grenades--30. The ammunition weight totaled 1,112 pounds.

b. "Each of the antitank company 1½-ton trucks carried 10 cans of water and 25 cases of K ration in addition to its normal load.

c. "Four of the regimental 2½-ton trucks each carried 55 cans of water and 65 cases of C rations. The combined load of men and vehicles provided a four day supply of rations and a two day supply of water. All of the vehicles listed above were crossed by the evening of D plus one.

d. "Each tank which crossed on D-Day carried the following extra ammunition for the infantry: One box of .30 caliber M-1, one box of .30 caliber machine gun, one box of .45 caliber, one box of fragmentation grenades, and one box of antitank grenades.

176. Evacuation. "The assault battalions and the regiment established aid stations on the near shore but moved across immediately after the battalions. Sufficient supplies were carried across to set up a modified collecting point until the collecting company could start operations. When the vehicular bridge was opened, jeeps and weasels were used to shuttle casualties to an ambulance point on the near shore.

177. Vehicle movement. a. "Each vehicle and each group of vehicles was given a

number and a location on the vehicle priority schedule. All vehicles stayed in their areas until called for by number from the traffic control station.

b. "The vehicles were crossed in the following order:

(1) "D-Day and D-Day night: Tanks of the supporting tank battalions.

(2) "D plus 1: Flame throwing tanks; tank destroyers; specially loaded company ¼-ton trucks and trailers and battalion wire ¼-tons; medical ¼-tons and ambulances; all battalion and regimental antitank guns; tank battalion gas and ammunition vehicles (2½-ton); tank destroyer battalion supply vehicles; flame throwing tank supply vehicles; the chemical mortar company (less supply, maintenance and kitchen vehicles); the infantry battalion radio and messenger ¼-tons; the tanks destroyer battalion maintenance; and miscellaneous vehicles.

(3) "D plus 2: The regimental cannon company; the chemical company maintenance, supply and kitchen vehicles; regimental headquarters company communications, liaison and command vehicles; regimental service company ammunition trucks; other special ammunition vehicles (from division); the chaplains; and service company wreckers.

(4) "D plus 3 and D plus 4: Other combat vehicles of the infantry battalions with normal loads."--S-4, 175th Inf Regt.

IV EXTRA AMMUNITION.

178. "We got additional ammunition across the Roer River for use in the early fighting by having each man carry a small extra load. In one company every man carried a bazooka round; in another, a mine; in another, an 81mm shell; and in still another, a 60mm round." --CO, 1st Bn, 405th Inf Regt.

V OTHER VIEWS ON SUPPLY AND EVACUATION.

179. General. "Supply and evacuation during the division's crossing of the Moselle River early in November were complicated by the fact that the river was out of its banks and one and a half to two miles wide. Speed of the current was eight to 10 miles per hour. The operation of boats was complicated by such obstacles as fences, posts, hidden shallows and mines. Bridging operations were slow, as spans were repeatedly washed out.

180. From the divisional viewpoint. a. "Supply dumps should be built up on the near shore two days ahead of the actual crossing to give sufficient time to sort the items and organize for priority. Dumps for supplies other than ammunition should never be more than two or three miles in rear of the crossing site.

b. "A build-up on the far shore should be begun as soon as a bridgehead is established and plans made to get the supplies over without counting on bridges. Ferries, assault boats and motor launches can maintain essential supply. On one occasion C-2 explosive and other small items including medical supplies were dropped from cub planes.

c. "DUKWS can be used to carry many items, including light vehicles. Crossing sites for DUKWS should be selected near roads and well away from intended bridge crossing sites.

d. "Items that should be given priority for crossing are bazooka ammunition, grenades and demolition supplies. Individual rolls and dry clothing must be sent over early.

e. "The supply plan must include the organization of carrying parties to get the supplies from the far shore to the assault troops. One combat team used about 1,000 men including the cannon and antitank companies, cooks, and administrative personnel for these parties, taking wheelbarrows, wagons and even baby carriages to get supplies to the fighting troops.

181. From the regimental viewpoint. a. "Near shore supply was handled by the regimental S-4 who checked and supervised the flow of the supplies to the far bank, the regimental munitions officer who procured and dispatched ammunition, and the regimental motor officer, who operated a traffic control post and supervised the loading of vehicles on ferries. The battalion S-4s handled all functions on the far bank.

b. "Men were issued one K and one D ration apiece before crossing, and received an additional K ration on each of four succeeding days. Kitchens crossed and served hot meals on the sixth day.

c. "Individual rolls were ferried across and distributed on the second day.

d. "To care for men who got wet, a small building was kept heated on each bank and small quantities of dry clothing kept on hand.

e. "The inability to cross tanks, tank destroyers and artillery to give close support to assaulting troops resulted, on the first day, in the expenditure of more small arms ammunition than had been expended on any other day in the regiment's operations in France.

f. "Weapons replacements were made by boat. Four heavy machine guns, four 81mm mortars and one antitank gun were replaced during the first 24 hours.

g. "Greatest losses were in signal items. Nearly all wire was torn out by armor. SCR 300 sets were replaced immediately; SCR 536 sets in five days.

182. Evacuation. a. "Collecting companies were split into two groups, one group operating ambulances from the near shore while the other operated as hand litter bearers on the far shore. This system continued for two days until a limited number of litter jeeps could be ferried across.

b. "Priorities were established for evacuation. Often lightly wounded cases had to stay on the far bank for hours awaiting their turn. In such situations extra medical supplies should be taken to the far shore early and stations set up to care for wounded whose evacuation is delayed.

c. "Cooks, ammunition and pioneer personnel and administrative personnel of infantry regiments were used as litter bearers."--G-4, 90th Inf Div and S-4, 359th Inf Regt.

VI MISCELLANEOUS TIPS.

183. Mine removal squads. "One mine removal squad with each rifle company would prevent many casualties and save valuable time."--Lt, Co A, 405th Inf Regt.

184. Wire cutters. "Men with wire cutters should be in the first wave as there are often obstacles under water as well as on the far bank."--Pfc Bruce H. Bailey, Co A, 405th Inf Regt.

185. Infantry boat crew. "Boat crews should be appointed in each rifle squad to take over in case of casualties among the engineer boat crew."--CO A, 405th Inf Regt.

186. Rope and buoys. "One boat in the leading wave of each company should carry with it to the opposite shore a rope with several colored buoys. The rope can be used as a guide by succeeding waves and also may help personnel whose boat is sunk or overturned during the crossing."--CO, 143d Inf Regt.

187. Improvised bridge for narrow river. "In our area the Wurm River has very steep banks six to seven feet high and is about 3½ feet deep and 10 to 15 feet wide. Several three-section foot bridges were constructed, 12 feet long and two feet wide. Two sections were placed slanting from the bottom of the river, one to the top of each bank. The third section was placed as a bridge between the other two."--CO, 1st Bn, 117th Inf Regt.

Chapter Nine

TANK AND TANK--INFANTRY OPERATIONS

I THE TANK--INFANTRY TEAM.

188. Command. "Infantry and tanks should be employed in the proper proportions and under the appropriate command to do the particular job most effectively. A task that is chiefly a tank mission should be handled under command of the tank battalion commander using a force that is mostly tanks with infantry attached. When the job indicates that a predominance of infantry will be more effective there should be no hesitation in attaching a proper number of tanks to the infantry commander in order to accomplish the mission."--Operations Notes, Hq, XII Corps.

189. Coordination. "Elements of the 2d Division, working with tanks, captured a hill with very few casualties after four previous attacks in the same area had failed. Officers and enlisted men who took part mentioned the following points as contributing to the success of the operation:

a. "Engineers accompanying the leading tank in each team carried mine detectors, and a lane was swept through each field.

b. "Two riflemen per squad were assigned the job of tank protectors. They moved to the flank and rear of the leading tank as a defense against individual enemy in spider holes.

c. "One-half the support squad of each platoon operated in each assault squad zone, usually from one to three fields behind the assault squad, for the purpose of cleaning out snipers. A battalion commander stated that no casualties were caused by snipers during this attack; whereas, in a previous advance made without use of this technique, snipers caused more than one-half of the casualties.

d. "The battalion commander had a wire line (W-130) to each company during the attack. Communication between infantry and tanks was maintained effectively through use of a EE-8 telephone mounted on the rear of the tank.

e. "To facilitate control, each field was assigned a number and progress was reported by the serial number of the field in which the reported element was located. Thus the location of the front line was always known with certainty."

190. Necessity for continuous pressure. "Regardless of the initial formation, it is not essential that tanks and infantry keep their respective positions in an assault. A tank must stop to fire effectively but that is the time for the infantry to press on. The infantry may be stopped by machine gun fire and if the enemy antitank defenses are ineffective the tanks should press on. Both arms must realize that the fact that one stops is not necessarily a reason for the other to stop."--Report of XIX Corps.

191. Communication. a. "Satisfactory infantry--tank communication was achieved by installing SCR 536s in the tanks. Removal of a bolt from the top of the turret provided a hole for the antenna. A short piece of rubber hose was placed around the aerial to keep it from grounding out against the turret. The radios were modified to permit the tank driver to use a throat microphone and operate the switch with an improvised extension."--Ex O, 3d Bn, 330th Inf Regt.

b. "We find control is facilitated in infantry--tank operations by using the following SOP:

(1) "When tanks are moving ahead of infantry, a tank is held back to provide the infantry commander radio communication with the other tanks.

(2) "When tanks and infantry are moving together, the infantry company commander rides in a leading tank with the tank platoon leader."--CO, Co E, 16th Inf Regt.

192. Relief of tanks for replenishment. "After being in action for a considerable time, tank platoons must withdraw to replenish ammunition and fuel. When the infantry observes this withdrawal, they feel they are being deserted and tend to withdraw themselves. This has been avoided by the following method: One tank platoon completely fueled and with ammunition is kept in the rear. This platoon relieves a platoon on the line by infiltration, one tank at a time. When the relieved platoon is assembled, it proceeds to the company dump, replenishes its fuel and ammunition, and returns to a position in the rear of the line and relieves the next platoon by the same method. The infantryman, seeing a tank move forward at the same time a tank moves back, realizes that his support has not diminished.

193. Helping the infantry. "When tanks are ordered to move at night, after a bivouac has been established, the commanding officers of the infantry units in the vicinity should be notified, as the sound of the movement of the tanks will normally draw artillery and mortar fire."--Report of 709th Tank Bn.

II TANK RIDING DOUGHBOYS.

194. A successful experience. "Both infantry and tank personnel were enthusiastic about the results achieved when infantrymen rode tanks into combat. The commanding officer of the 22d Infantry Regiment made the following comments regarding this type of action:

a. Tactical advantages. (1) "The infantry are above enemy machine gun fire which is generally set at grazing level.

(2) "The infantry becomes a more fleeting target for enemy automatic weapons. It is difficult for the enemy to traverse and elevate a machine gun from a dug-in hedgerow position to bring accurate fire on a tank moving from eight to 10 miles per hour.

(3) "The tank turret also provides some protection against small arms fire.

(4) "The infantrymen on tanks are in a good position to toss grenades into foxholes.

(5) "The infantrymen are able to provide excellent protection for the tanks from enemy bazooka and antitank grenade fire.

(6) "The infantrymen help to provide observation for the tank crews.

(7) "This practice undermines the German tactical doctrine of shooting the infantry following the tanks. When German doctrine is undermined, the efficiency of their operations is greatly reduced.

(8) "When the advance is retarded by antitank guns, infantry can dismount, deploy, and bring automatic fire on enemy gun positions.

b. Problems which arise. (1) "Command and staff organization and coordination.

(2) "Transportation for infantry supporting weapons in order to make them readily available for holding the objective.

c. Commanders ride together. "The infantry and armor are not organized to work together, and careful and thorough planning are, therefore, essential for such an operation. The command problem was partially solved by having the infantry battalion commanders ride in tanks with the tank battalion commanders--directing the attack by radio.

195. Additional comments. "We ride eight men on a medium tank and six on a light tank, all on the rear deck. It takes only ten minutes to train them. We first send out a wave of tanks buttoned up, put time fire from the artillery on them, and follow with the tanks carrying the men. The artillery observer rides with the leading wave and controls the fire, setting his fuses a little high. To insure coordination by the infantry commanding officer and the tank commanding officer, I put them both in the same tank. The infantry commanding

officer hangs his SCR 300 radio on the outside of the tank and works directly with that part of his battalion which follows in trucks or on foot. Infantry company commanders can talk to tank platoon commanders by telephones hung on the back of the tanks. We fought this way for eight days and nights, and the foot soldiers loved the scheme. It does, however, have one disadvantage, in that it does not capitalize on the full strength of the infantry regiment, since it fails to use most of the crew-served weapons."--22d Inf Regt.

196. Other views. a. "When a tank on which infantry is riding is knocked out, the infantry should immediately mount another tank. No more than four men should ride on one tank. A greater number may prevent movement of the turret gun. When tanks attack in waves, the machine gunners in the rear tanks must be careful to avoid hitting the men on the leading tanks."--CO, Co, B, 33d Armd Engr Bn.

b. When carrying infantry on the rear deck of your tanks through towns, be sure that the tanks in the rear do not fire their bow guns, as the bullets will glance off buildings and inflict casualties among your own infantry."--Lt, 31st Tk Bn.

197. Disadvantages. "One combat command commander points out that infantry should never remain on the tanks during actual fighting. He feels that maximum results from armor are gained by violent execution of a carefully planned attack, using to the utmost the mobility and great fire power of the tanks. Carrying infantry on the tanks, he believes, does not lend itself to this type of attack for the following reasons:

a. "The tank driver moves more carefully because of his consideration for the riders, and this restricts mobility.

b. "Tanks in rear of the leading wave have to be more careful of their fire because of the danger of hitting infantry riding on forward tanks. In a tank assault every machine gun should be shooting.

c. "The tank is apt to take routes which offer more protection to the infantry. This restricts maneuver.

d. "The turret guns, when rapidly turned, are apt to hit the infantrymen. Operation of the guns is thus restricted.

e. "When infantry are mounted on tanks, their squad and platoon organization is disrupted. When they dismount to fight, time is lost during reorganization, and fire from normal supporting weapons cannot be adequately coordinated.

f. "Employment of the antiaircraft machine guns on the tanks is hindered."--7th Armd Div.

III ARMORED INFANTRY.

198. "Our armored infantry fight from their vehicles just as long as possible. This permits maximum use of vehicular weapons, some protection from small arms fire and shrapnel, and the men are fresher for the final assault."--6th Armd Div.

IV TANKERS MAY BE TOO TANK-BOUND.

199. "Many tankers are too tank-bound. Tank platoon leaders and sergeants can give better advice to the infantry commander on tank employment if they reconnoiter on foot before an attack."--Co B, 774th Tk Bn.

V TANK EXPEDIENTS.

200. Turret cover. "Some units have modified the mounting of the turret cover of the M-4A3E2 tank so the cover opens to the rear. This permits leaving the cover open when moving without danger of damage from striking obstructions. Some units also weld a steel

ring around the outside edge of the hatch opening recess to prevent water running into the recess."--Ex O, 7th Armd Group.

201. Substituting a .30 caliber machine gun. "Substitution of a .30 caliber machine gun on the tank antiaircraft mount has been reported as desirable by tank officers in the Mediterranean Theater. They feel that Allied air superiority makes the .50 caliber machine gun unnecessary, and that the additional .30 caliber machine gun is desirable for use against personnel. Other advantages are that the ammunition supply is simplified and that more ammunition can be carried in the same space. Units which have tried the modification find the gun 'very handy'".--Report of Armd Group to WD Board.

202. Adding a .30 caliber machine gun. "We welded a .30 caliber machine gun with a cut-down tripod to an M-4 medium tank turret. The machine gun was placed in front of the tank commander who used tracers to indicate targets to the other tanks in his platoon."--Tk Co Comdr, XII Corps.

203. Tank escape hatches. "We have removed the backs of seats to facilitate handling of ammunition and access to escape hatches. The escape hatch levers have been removed, as they frequently stick. The hatches are then fastened with wire."--Platoon Leader, Co G, 709th Tk Bn.

204. Anti-dim for sighting instruments. "We put regular gas mask anti-dim on the sighting instruments (periscopes, telescopes, and panoramic sights) in our tanks to prevent their fogging up when we go into action buttoned up. The anti-dim clears the vision completely. It lasts between six and eight hours."--Platoon Leader, Co C, 21st Tk Bn.

VI TANK EMPLOYMENT.

205. Improper practices. "Instances of improper employment of tanks with infantry units have been observed recently as a result of the following practices:

a. "Specifying SOP assignments for supporting tanks which break down tank units to the extent that the employment of tanks in mass and depth is not possible.

b. "Employing tanks under conditions where tank crews did not have visibility even as far as enemy bazooka range.

c. "Using tanks to draw fire along routes which offered no place for maneuver and employment of weapons.

d. "Having tanks occupy exposed positions for long periods of time without infantry protection.

e. "Operating tank dozers with inadequately trained crews.

f. "Employing tanks as fixed pillboxes or machine gun posts for long periods of time, thus violating the principle of fire and movement, and drawing excessive fires upon nearby infantry."--XX Corps memo.

206. In woods fighting. a. "Teams of one medium and two light tanks were found valuable when fighting along trails. The medium follows the trail with a light tank on each flank.

b. "Most targets for the 75mm gun called for fuze delay. Loading of the piece was expedited by setting the fuzes on delay before placing the ammunition in the tank.

c. "Fifty-caliber machine guns should be removed when fighting in the woods. Branches damage the gun and cradle and endanger the tank commander by causing the gun to swing around."

207. Town fighting. "Tanks should never be left in towns at night. A town in our hands is a good target for the enemy at any time, and the presence of tanks will almost insure an enemy artillery concentration."--CO, 747th TD Bn.

VII TANK FIRE.

208. Reconnaissance fire. "Advancing tanks must employ reconnaissance by fire--shoot at any object behind which an antitank gun might be concealed. Such fire should be used, where possible, at ranges greater than 2000 yards. Failures to shoot up haystacks on one occasion cost several tanks."--Training Directive, 7th Armd Div.

209. Against German armor. "When German armor attacks frontally, we fire a round of high explosive and then change to armor-piercing. The high explosive usually forces the German tank to change its course and expose a more vulnerable part to our armor-piercing. In any case, it will disturb his laying or impair his sight."--C/S, 12th Armd Div.

210. White phosphorus. "We have had excellent results with white phosphorus fired from the 75mm tank gun. It is very effective in the attack of villages as it sets fire to houses and drives the Germans out more quickly than high explosive. Its use against enemy armor is giving excellent results, tending to blind the hostile tank crew and allowing our tanks to maneuver."--CO, Tk Bn.

211. Indirect fire. a. "Tanks customarily use the center tank as the base gun. When this is done, the artillery unit to which the tanks are attached should be notified as the artillery practice is to use No. 1 gun as the base piece.

b. "Greater accuracy is obtained by placing the tank broadside to the direction of fire and on level ground.

c. "Tanks were able to confuse enemy counterbattery effort by buttoning up and continuing to fire. The enemy apparently decided that they were firing in the wrong places as the fire usually ceased or shifted to another location.

d. "We put a captured German telephone in each tank to permit the gunners to hear fire orders while buttoned up."--CO, Co C, 709th Tk Bn.

212. Control of indirect fire. "The indirect fire of our tanks is controlled by placing all the tank radios of each platoon on interphone and connecting them by means of W-110 wire, clipped to the extra headset unit of each tank. The jack of the unit is then plugged into the tank interphone control box. By hooking a field telephone on one end of the circuit the platoon leader can communicate with all of his tanks. This system also works when tanks support infantry on road blocks. The wire is run to the listening post, and the sentry can communicate directly with the tank crew."--CO, 81st Tk Bn.

213. Reinforcing fires from reserve tanks. "Tanks and tank destroyers in reserve or being repaired should have wire communication with the fire direction centers and be used for reinforcing fires--even if they are in the maintenance park."--45th Div Arty.

VIII SELF-PROTECTION AGAINST BAZOOKAS.

214. "A tommy gun and hand grenades should be kept on top of the turret where the tank commander can use them quickly against bazooka teams or other close-in enemy."--Co D, 67th Armd Regt.

IX LIGHT TANKS.

215. One per medium tank company. "We attach one light tank to each medium tank company to serve as a reconnaissance vehicle for the company commander, a supply vehicle when fire is heavy and terrain difficult, and an evacuation vehicle for the wounded. For evacuation purposes racks are constructed on the back of the tank which permit carrying three casualties in a prone position. Straps are used to secure the wounded men. One member of the tank crew is trained as an aid man because of the lack of room for an additional man on the tank."--CO, 3d Bn, 66th Armd Regt.

216. Forward observation vehicle. "To secure observation for my assault guns and mortars, the assault gun platoon leader is mounted in a light tank instead of the assigned half-track. Using the light tank he can go wherever the tanks go and perform efficiently the duties of a forward observer, which he cannot do in a half-track."--CO, 2d Bn, 66th Armd Regt.

217. Retrieving vehicle. "A light tank with a boom mounted on the chassis makes a good wrecker, as it has a low silhouette and is maneuverable."--Maint O, 82d Rcn Bn.

X USE OF AZIMUTH INDICATOR.

218. "Setting the azimuth indicator to read zero when the gun is pointed toward magnetic north serves these two purposes; first, it facilitates use of the gun for fire missions under battalion control, and, second, it permits quick determination of the direction of enemy artillery for shell reports. The gun is simply pointed in the direction of the enemy gun and the azimuth read."--Co H, 67th Armd Regt.

XI MEDICAL EXPEDIENTS FOR ARMORED UNITS.

219. Evacuation of casualties. "The following system has been successfully employed by a tank battalion of an armored division:

"Each medium tank company is furnished an aid man in a ¼-ton truck who evacuates casualties to the battalion aid station. If casualties are heavy, additional vehicles may be dispatched, or the battalion surgeon may go forward to treat the casualties. An advantage of this system is that travel from front to rear and return presents fewer hazards than travel laterally from company to company.

220. Equipment for medical vehicles. "Each medical vehicle should carry a .50 caliber ammunition box filled with medical supplies most used in combat. Splints, litters, and plasma should also be part of the normal load of such vehicle."--Surgeon, 10th Tk Bn (From WD Board Report).

Chapter Ten

ARTILLERY NOTES

I INCREASING EFFECTIVENESS OF FIRE.

221. Reinforcing battalions. "The method of having each direct support battalion reinforced by a general support battalion proved superior. It gets quick reinforcing fires on any target holding up the infantry advance (if of sufficient importance to justify use of general support battalions). It also permits, planning for reinforced defensive fires in case of counterattack. The third advantage is to give each infantry battalion continuous support during displacement, since forward observers can fire either battalion while the other is displacing."--1st Inf Div.

222. Let everyone know what is going on. "We have found that it speeds up a firing battery to send gunners, section chiefs and other key enlisted personnel out with the forward observer occasionally. If time permits, the fire direction center should describe the target and the results of the shoot to the battery. I have seen my men shaking hands after being told that they had destroyed 10 enemy vehicles."--102d FA Bn, 26th Inf Div.

223. A German view. "The following comments were made by a captured German general who has been a professional artilleryman since World War I:

a. "'It seems to be an established principle of allied artillery not to fire in rainy or foggy weather, at lunch or dinner time, or at night. When shelling took place during these times I concluded that special orders had been issued by higher headquarters and I immediately warned my unit commanders to be prepared for an attack.

b. "'Allied interdiction fire on critical points was carefully planned but I could anticipate its location in time to take necessary countermeasures to protect my convoys and troops. Traffic in rear of the German lines can be jammed more effectively if artillery commanders keep this question constantly before them: "What alternatives has the enemy in order to get his supplies through?" Mental alertness and imagination in the choice of objectives will increase the value of the allied superiority.'"--Seventh Army Arty O.

II 155MM TIPS.

224. Employment. "The 155mm gun, self-propelled, should be employed by direct attachment of a battery to the division artillery. There should be careful evaluation of requests for its fire and an ample allowance of time for the battery commander to select positions. In deciding as to its employment the following factors should be considered:

a. "The noise of the weapon and the maximum rate of march of 20 miles per hour.

b. "Its limited rate of fire due to the difficulties of loading without elevating the tube.

c. "Its high silhouette in firing position.

d. "The absolute lack of protection for the crews from small arms fire. The gunner is particularly vulnerable due to his open position on top of the tank.

e. "The huge muzzle blast which draws counterbattery fire."--CO, 196th FA Gp.

225. Flash reduction. "When firing normal charge, we save the super-increments of the flash reducer T-1 for future use. Two super-increments tied around one normal propelling charge result in effective flash reduction and no alteration in the velocity error correction. No additional tapes are necessary to tie these increments around the powder as the loose end of the first reducer increment is secured by the overlap of the forward edge of the second when tied in position."--CO, 557th FA Bn.

226. Use of phosphorescent paint. "Painting the breech ring and breech lever of the 155mm howitzer with phosphorescent paint greatly simplified the problem of loading at night."--Sgt M. T. Vennille, 227th FA Bn.

III COMMUNICATIONS.

227. Keep commanders informed. "Unit commanders must be kept informed of the status of their artillery communication channels as a failure of these communications involves the grave risk of advancing or holding without adequate artillery support. Artillery observers, liaison officers, and artillery commanders are charged with the responsibility of notifying the commanders of supported units when artillery communications are not working." --XII Corps.

228. Location of division artillery command post. "The artillery commander in certain operations located his command post approximately 6,000 yards in front of the division command post. His explanation was: 'I like my command post to be in the middle of my battalions. The communications are shortened, and I can keep up better with what's going on. I visited the division commander at least twice each day and kept a liaison officer at the division command post at all times.'"--1st Inf Div.

229. Direct wire lines. "In this corps we lay a direct line to group headquarters and division artillery headquarters from our fire direction center, in addition to the normal lines from corps artillery to those headquarters. This direct line is also connected to our normal lines through their switchboard and by remote control may be plugged into the radio set. Group and division artillery headquarters also have similar direct lines, in addition to the normal lines, to each of their subordinate headquarters. This system makes it possible for corps artillery to exercise immediate control over all its subordinate units and to bring in fire of any or all elements in an absolute minimum of time. Wire is much faster and better than radio."--Asst S-2, XIX Corps Arty.

230. Liaison communications. "We run two lines from the artillery battalion to the liaison officer and from the liaison officer to each of his forward observers to permit him to coordinate the firing by listening in."--44th Div Arty.

IV FORWARD OBSERVERS.

231. Three observers per infantry battalion at all times. "Three forward observers should be kept with each infantry battalion at all times to insure that observers will be available for reserve companies that are hurriedly committed. Forward observers should remain forward during the night. Recently a strong attack at night on one of our units was repelled largely by an alert observer who brought in the fire of 15 artillery battalions."--XII Corps.

232. Continuous radio communication. "Our forward observers usually required 10 to 15 minutes to remove their SCR 609 (or 610) radios from their jeeps and set them up. We have solved the problem of maintaining continuous communication by mounting the radio and batteries on a packboard, with the antenna changed to extend upward."--CO, Btry A, 374th FA Bn.

233. Advantages of rotation. "All lieutenants of the battalion take their turn as forward observers with the infantry in tours of four days duration. Battery commanders can only be spared for two-day tours. The battalion commander and staff visit observation points and infantry battalions in the line. Personnel of the forward observation parties are rotated so that even the cannoneers get up with the infantry. This creates a high unit spirit, a profound respect for the hard job of the infantry, and makes each man personally realize the necessity for accurate shooting."--110th FA Bn.

V AIR OBSERVERS.

234. Training. a. "More tactical training on all types of operations should be given young officers so that they may observe more intelligently.

b. "New pilots and observers are often weak on communications--they fail to think out what they must transmit to give the fire direction center complete information for rapid attack of targets.

c. "Replacement pilots should be attached to corps for training pending assignment." --VIII Corps Arty Air O.

235. Coordination of flying levels. "We handle air observation posts by coordinating levels used by division and corps planes. For example, division planes fly to 1,000 feet and corps above 1,500. This procedure is essential in attack of a small area. We also limit the number of planes in the air at any one time by having Group planes patrol on a time schedule."--VIII Corps.

236. Maintaining continuous observation. "We have often found it necessary to give each direct support artillery battalion four planes, thus enabling them to keep one in the air at all times. We obtain them from the corps artillery groups and the general support battalions of divisions."--XII Corps.

237. Trick to locate enemy battery. "When patrolling cub planes were unable to detect any hostile batteries, they flew toward home at high altitude. After flying a few miles, the cubs returned at such a level that they were not silhouetted against the sky but were still able to observe. Frequently the enemy had opened fire, thinking he was not under air observation."--410th FA Gp.

238. Combination of photo and map. "Our air observers use an ungridded oblique photo together with a 1:25,000 map; the important artillery concentrations are plotted on both. This combination helps the observer to orient himself."--S-3, 107th FA Bn.

239. Selecting a new division air field. "When the advance of the division requires selection of a new air strip, I send a jeep with an SCR 610 to the vicinity of the new division command post. I fly to the area with an observer, select a field from the air, and direct the jeep to that field by radio. The jeep crew reconnoiters the field and if it is suitable, I land. If the field is satisfactory I send the jeep back to the division command post and have a telephone line run to the old field where the observer acts as guide to move the ground crews and vehicles forward. Planes are dispatched from the old air strip and land at the new one. The SCR 610 with the jeep provides communication for the new strip until the arrival of the other equipment."--Arty Air O, 28th Inf Div.

VI TANK OBSERVERS.

240. "An artillery forward observer should go forward in one of the tanks of each supporting element of tanks. Although tank commanders do an excellent job as artillery forward observers, the artillery should not expect the tankers to do this habitually." --Ex O, 229th FA Bn.

VII EMPLOYMENT OF WHITE PHOSPHORUS.

241. Careful consideration. "Before deciding to use white phosphorus, artillery observers should consider the following points:

a. "Is it the most suitable shell to perform the mission?

b. "How much is available; if smoke is used will it mean a shortage of smoke for a more important mission later?

c. "What will be the effects other than the primary effect sought? In considering this question, the following points are important:

(1) "Will the screening effect interfere with important observation for subsequent fires?

(2) "Will the smoke drift so as to hamper the operations of an adjacent unit?

(3) "Will the screening effect assist the enemy by permitting movement under its cover?"--95th Inf Div Arty.

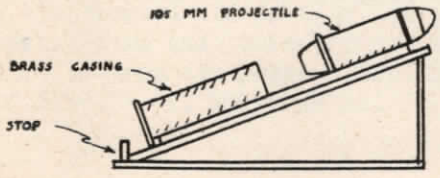
242. Use for registration. "The use of white phosphorus to mark initial rounds for ground and air observers should be discouraged in medium field artillery battalions. With reasonably accurate initial data, and by noting the time of flight from the range tables, the medium burst can usually be picked out. Excessive use of white phosphorus for marking initial rounds not only is wasteful but adds to the observers difficulties by increasing the battle haze."--227th FA Bn.

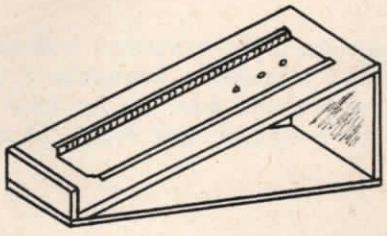
VIII USE OF SMOKE TO AVOID COUNTERBATTERY FIRE.

243. "The fire of our 155mms usually brought down immediate counterbattery fire from the enemy. This was overcome by putting the observer well forward and placing a smoke candle screen in front of the battery positions. The screen prevented the enemy from observing his fire and made his counterbattery efforts ineffective."--Arty Comdr, 90th Inf Div.

IX ASSEMBLING SEMI-FIXED AMMUNITION.

244. "We use the device shown below to eliminate pinched fingers when assembling the projectile to the case of 105mm ammunition. It simplifies and facilitates assembling rounds at night and when operating with reduced personnel. The frame of the device is constructed from an ammunition box and the slide from a ground stake of camouflage set No. 2. The base of the shell case is placed against the stop, and the projectile at the top of the slide which guides it into the case."





--Ex O, Btry A, 229th FA Bn.

X MORE TRACTION FOR TRUCKS IN MUD.

245. "Flotation and traction in mud can be greatly increased by adding the two spare wheels to the two front wheels of the trucks and adding a pair of dual chains. Our prime movers are usually driven only a few miles per day and we find that this system works very satisfactorily."--102d FA Bn, 26th Inf Div. (Note: The Ordnance Section, Headquarters, European Theater of Operations, United States Army, recommends that this modification be considered as proper only for use in mud and states that it should not be used on hard roads.)

XI SHELL REPORTS.

246. "We require each of our gun crews to measure the deflection to a flash or explosion with their panoramic sights. The battery executive officer converts this to a 'Y' azimuth direction. Gunners take the 'flash-bang' time. Thus, there are always 18 flash and sound observation posts alert and watching. With flank batteries widely separated, a good intersection is often obtained on the same enemy battery. We don't wait for Jerry to shoot at us to initiate the shell report."--CO, 87th Armd FA Bn.

XII DIVISION ARTILLERY COMMENTS.

247. Estimate of situation. "We require the artillery battalion commanders to give an estimate of the situation once or twice daily. This keeps the battalion commanders alert to the infantry situation and facilitates planning by the artillery commander.

248. Police of brass. "Approximately 450 tons of empty shell cases have been recovered in an area which had been occupied by other divisions. Police of the critical item of brass should be given a high priority."--44th Div Arty.

Chapter Eleven

TANK DESTROYER NOTES

I TACTICAL EMPLOYMENT.

249. Aggressiveness essential. "The practice of holding tank destroyers back--the infantry going forward, then the tanks, followed by the tank destroyers--tends to foster timidity and lack of aggressive action. Platoon leaders and M-10 commanders should go forward with the infantry, locate effective firing positions, and then have their vehicles brought forward."--CO, 634th TD Bn.

250. Assignment of forward zones. "We employ our tank destroyers well forward both in attack and defense, assigning them zones with forward elements. Within these zones they move about to avoid hostile fire and to obtain better firing positions. They withdraw only upon agreement with the infantry commander. The forward employment permits immediate support to the infantry, insures infantry protection for the tank destroyers, facilitates reconnaissance, and usually makes unnecessary any hurried movement into position.

251. In the attack. "The destroyers accompany the infantry in the attack, a platoon with an infantry battalion. The platoon moves forward by bounds, generally with the reserve company. The platoon leader goes ahead on foot with the leading company commanders, reconnoitering routes and gun positions, keeping in touch with the front line infantry situation, and directing the forward movement. For communication SCR 536s have been acquired--one for the platoon leader and one for each vehicle. Any force holding up the infantry is a suitable target. On targets other than tanks, usually only one gun is employed; the others lie concealed ready to engage enemy armor if it appears when the first gun opens up.

252. In the defense. a. "In defense the guns are kept close to the front line positions, carefully camouflaged, and their action is closely coordinated with the infantry. In a recent engagement it was agreed that the infantry would take care of the enemy infantry and the destroyers would handle the tanks. Everyone understood and it worked well. The tank destroyer battalion knocked out 43 enemy tanks and lost only four guns."--CO, 705th TD Bn.

b. "There is a feeling in many towed tank destroyer units that they should be far back behind the infantry line to 'stop a breakthrough'. In certain types of terrain, defense of reverse slopes is essential. Guns too far behind the main line of resistance are useless, for if a breakthrough occurs the enemy is intermingled with our own troops and tank destroyers cannot fire. Breakthroughs must be prepared for locally--not in areas 1,800 to 2,500 yards to the rear."--4th Armd Div Memo.

253. Infantry must understand capabilities. "Senior infantry officers generally understand the correct use of tank destroyers but junior officers sometimes do not realize their capabilities and limitations. For example, a section of tank destroyers attached to an infantry platoon was ordered into impossible terrain where the vehicles became hopelessly bogged down."--CO, 634th TD Bn.

II OCCUPATION OF POSITIONS.

254. Foot reconnaissance. "We insist upon reconnaissance on foot and have trained the reconnaissance platoon especially for it. They have also been trained to fight as infantry when necessary."--CO, 705th TD Bn.

255. Slow movement. "Move into position slowly. The vehicle can be better controlled and better prepared to fire. Fast movement attracts attention and causes considerable noise."--703rd TD Bn.

256. Concealment of noise. "Artillery fire placed on three enemy tanks caused them to button up and prevented the enemy from hearing our tank destroyers moving up. The tank destroyers knocked out all three tanks without loss."--S-2, 813th TD Bn.

257. Pushing the towed gun. "In many cases the towed 3" gun cannot be pulled into position by the prime mover because of the danger of drawing enemy fire. To avoid manhandling the gun, we reinforced the jeep front bumper, mounted a pintle on the front of the jeep and pushed the gun into position."--CO, 644th TD Bn.

III ENGAGING TARGETS.

258. Enemy infantry. "On enemy infantry use high explosive, fuze delay, and aim slightly short. Ricochets will often cause low air bursts over the enemy.

259. Light vehicles. "Use the .50 caliber machine gun on thin-skinned vehicles up to 300 yards. Over that distance use 3" high explosive.

260. Range cards help. "Range cards are still necessary. Get exact ranges from the map in daylight, and if possible, zero in on critical points and record the data."--703rd TD Bn.

IV UNUSUAL MISSIONS.

261. Fire adjusted from forward observation post. "One platoon of our tank destroyer battalion was supporting an infantry battalion which was pinned down by small arms fire from dug-in armored vehicles. Artillery could not give support because the infantry was too close to the enemy. The tank destroyer platoon leader, from the infantry battalion observation post, ordered fire upon an emplaced half-track which was holding up the advance. Three rounds of high explosive fired at a range of 4200 yards burned the vehicle and killed the crew. Five more rounds neutralized enemy resistance sufficiently to permit the battalion to resume its advance into the nearby town. The infantry cleaned out the lower floors of buildings while the tank destroyers knocked out enemy strong points located on the upper floors."--S-3, 707th TD Bn.

262. Harassing fire. "Excellent success has been reported by the 813th and 607th Tank Destroyer Battalions in delivering harassing fire on long straight roads. A platoon of tank destroyers was placed in position in prolongation of the tangent. A cub plane would conduct an adjustment daily at ranges between seven and twelve-thousand yards, zeroing the platoon in for direction. A 24-hour harassing fire at odd intervals and varying ranges was fired with high explosive. After the road had been captured an examination disclosed that this fire had been very effective. Roadside trees had caused air bursts; rounds striking the hard roadway had ricocheted causing heavy casualties to vehicles and personnel on the road."--CO, 5th TD Group.

263. Anti-personnel fire. "Our tank destroyer company fired an indirect fire mission on some woods 11,000 yards to the front using high explosive with superquick fuzes. Surprise was obtained by having all twelve guns open fire at the same time and continue with rapid fire. It was later reported that 593 dead Germans were found in the woods."--Lt, 814th TD Bn.

264. Night fire against tanks. "Illuminating shells from 60mm mortars have proved very valuable for firing on tanks at night. The mortar is fired a little distance from the destroyer to avoid disclosing the position. The bipod and base plate are not used. Every tank destroyer section should have a mortar."--CO, 705th TD Bn.

V COORDINATION WITH AIR OBSERVATION POSTS.

265. On air OP net. "Each tank destroyer has a channel on the artillery air--ground net. Each tank destroyer company commander has this channel monitored during hours of daylight. When the air OP spots a tank destroyer he calls 'Hello 99' giving the coordinates. The tank destroyer company commander nearest the target answers and notifies the platoon concerned. The platoon commander checks in on the air--ground net and his four tank destroyers listen in. The platoon then reverses the identification panels on its vehicles for identification by the air OP and engages the target. The air OP keeps the platoon informed of the movements of the target."--9th Inf Div.

266. Permanent air observer. "We have an officer permanently assigned as an air observer and have found him to be of tremendous assistance. A neighboring field artillery group lets us use their observation planes."--CO, 654th TD Bn.

VI MOUNTING MACHINE GUN FOR USE AGAINST PERSONNEL.

267. "Mounting the .50 caliber machine gun on the right forward section of the turret of an M-10 tank destroyer for use against personnel has proved valuable. When this gun was employed against intrenched enemy they shortly surrendered to our accompanying infantry."--CO, 773d TD Bn.

VII HIGH EXPLOSIVE DANGEROUS IN WOODS.

268. Preplan your ammunition load. "In planning for woods fighting it is essential that the basic load of ammunition be modified to include a majority of AP or APC. The use of high explosive is greatly limited by the possibility of tree bursts on friendly troops."
--CO, 773d TD Bn.

269. Check clearance. "When infantry is directly to the front in bushy or wooded terrain, we fire a round of AP to check mask clearance as a precaution against bursts with subsequent high explosive fire."--CO, 823d TD Bn.

VIII IMPROVISED RECONNAISSANCE PLATOON.

270. "The two reconnaissance platoons provided by the tables of organization for this battalion are inadequate since all three gun companies are invariably committed and each needs a reconnaissance platoon. We have organized a third platoon, taking personnel from the maintenance, transportation and headquarters platoons. The reconnaissance officer commands it. To equip it we robbed our rear echelon and command post of jeeps, radios, weapons, etc. We feel that the benefits have fully justified the effort."--823d TD Bn.

IX WIRE COMMUNICATION.

271. "Infantry companies and tank destroyer platoons must be tied in by wire, and by radio if possible, to insure mutual support and coordination."--S-2, 813th TD Bn.

X DON'T GIVE AWAY POSITIONS AT NIGHT.

272. "Tank destroyer crews should not reply to enemy small arms fire at night. One night a tank destroyer platoon ignored considerable enemy machine pistol fire. At dawn seven enemy tanks were discovered in the area from which the fire had come--only 200 yards away--ready to engage any answering weapons. All of the tanks were destroyed."--CO, 771st TD Bn.

XI TEAM WORK PROTECTS WIRE LINES.

273. "We have saved our wire crews much work by carrying on each tank destroyer two poles with hooks on the end so that we can quickly lift field wire lines and run under them."--Ex O, TD Bn (Italy).

Chapter Twelve

4.2 CHEMICAL MORTAR NOTES

I POSITIONS.

274. "We don't use 'ideal' mortar positions, because the enemy is familiar with the ground and is zeroed in on the best positions. We find that locations in towns are most satisfactory--gravel roads provide solid base plate positions and nearby buildings give excellent cover and concealment."--CO, Co C, 92nd Cml Bn.

II METHODS OF CONTROL.

275. Through the infantry. "The most effective close support from mortars is obtained by making the heavy weapons company commander responsible for all mortar support, both organic and attached. He coordinates the mortar fires with the artillery. Observer teams from the heavy weapons company are placed with each rifle company. They are composed of one noncommissioned officer, a telephone operator and a lineman and are equipped with an SCR 300 and a telephone. Fire control is through a fire control center but it only designates the section or platoon to fire. Fire adjustment is handled directly between the observer and the gun position."--CO, 3d Cml Bn.

276. Company fire direction centers. "Three of the companies of the corps chemical battalion used 12 mortars each. The fourth was divided into a service company and a headquarters company. A fire direction center was organized and trained in each company. The companies (three platoons of four mortars each) were trained under artillery direction to lay and fire the mortars like any other artillery weapon. All 36 of these mortars were used in the fire plan of the _____ Division when that unit jumped off on 7 July. Ten minutes after the artillery preparation was completed, the mortar fire was brought down. By this time the Germans had come out of their fox holes and many were killed by these mortars as shown by examination of their bodies. The mortars were used later to reinforce the fires of the direct support artillery and did excellent work. To be used effectively the mortar crews must be trained as artillerymen."--CG, Corps Arty.

277. Coordination with artillery. "We have tried all methods of fire direction and believe that mortar forward observers and mortar company fire direction centers constitute the best solution when supporting an infantry unit. When reinforcing artillery fires we tie in with the artillery fire direction center. Through them we register by any of the normal artillery methods of registration."--S-3, 81st Cml Bn.

III EXAMPLE OF FLEXIBLE EMPLOYMENT.

278. Registration. "On 14 July the battalion moved into position to fire a controlled barrage in support of the 134th Infantry Regiment which was to make the initial push on the division left flank. Registration of one mortar was accomplished by our own observer in the division artillery observation plane.

279. Infantry-controlled barrage. "Fire mission began at 0600 hours 15 July, with all companies firing preparatory fires, and continued with a controlled rolling barrage in front of the advancing infantry until 2000 hours--a fourteen hour continuous shoot expending 6953 rounds of ammunition. During the whole time fire was controlled by the assaulting infantry. They called through their artillery who had direct communication to the mortar battalion

fire direction center which in turn controlled the fire of the three companies. Throughout the day, rate of fire, rate of advance, and changes of direction were made whenever desired by the assaulting infantry. At one period fire was held on a line for four hours with the rate of fire determined by the reorganizing infantry.

280. Targets of opportunity. "On 16 July, the attack of the 134th Infantry having been successful, the mortar companies were attached to the various regiments for independent direct support missions. Company C continued in support of the 134th; Company B was assigned to the 137th; and Co A to the 320th. During this period each company sent out forward observation parties with the leading elements of the infantry and fired missions desired by the battalion commander on targets of opportunity. Company C, for example, accounted for four machine guns with an expenditure of 26 rounds. The time lapse from 'target sighted' until 'mission accomplished' was eleven minutes.

281. Massed fires possible. "At all time during these independent missions, each company had at least two platoons in firing position. Although platoons were normally assigned to support the assault battalions, the fire of all platoons was controlled through the company fire direction center and the company could always mass fire on the regimental front. Normal defensive fires were assigned each night with mortars laid and ammunition prepared. The attachment to regiments for direct support lasted two days and all companies reverted to battalion control at 1800 hours 17 July.

282. Support according to the situation. "The complete operation gives a clear picture of the flexibility of 4.2 mortars. In the first phase, the battalion of 36 mortars moved into position to give maximum concentrated fire support for the first punch; in the second phase, the supported regiment having broken through, the mortar companies left battalion control and were attached to the regiments for independent missions. In the latter phase mortar platoons were 'leap-frogged' forward to maintain continuous support for assault battalions."--92nd Cml Bn.

IV TWO TYPES OF MISSIONS.

283. Covering evacuation. "We lay smoke screens with our 4.2 mortars to protect front line infantry when they evacuate their wounded by vehicle or when they take forward food and blanket rolls. Three to five rounds of white phosphorus usually are enough to lay the screen and one round per minute enough to maintain it."--Ex O, 91st Cml Bn.

284. When attacking fortifications. "The artillery and 81mm mortars were very effective in reducing movement of personnel outside of pillboxes but it was the 4.2 chemical mortars, firing 150 yards ahead of the assault companies, which most effectively reduced the enemy fire during the assault. It was not necessary to use bangalore torpedoes or wire cutters for the wire had been pretty well torn up by the 4.2 mortar barrage."--Bn CO, 117th Inf Regt.

V SPARE PARTS.

285. "One spare mortar is kept at each platoon position and used to supply substitute parts when they are needed immediately. Repair is made later."--Co C, 92nd Cml Bn.

VI WET WEATHER BASE PLATE.

286. "A wooden sub-base plate twice the size of the 4.2 mortar base plate served to keep the regular plate from sinking when firing in very wet ground. The wooden plate is made so the spades will fit into it and is always dug in."--Co C, 92nd Cml Bn.

VII REDUCING DISPERSION IN COLD WEATHER.

287. "Excessive dispersion caused by the effect on powder of near zero temperature has been eliminated by having some men in each squad keep a supply of powder rings for the mortar shells inside their shirts."--Asst CWS O, XII Corps.

VIII CHECK FUZES TWICE.

288. "All shell fuzes are tested both before firing and at the position during firing to insure against barrel bursts. Three faulty fuzes were discovered in one day when using this method."--Lt, Co C, 92nd Cml Mortar Bn.

Chapter Thirteen

CLOSE AIR SUPPORT OF GROUND TROOPS

I DIVISION AIR SUPPORT ORGANIZATION.

289. "I have within my division an air staff composed of an air support party officer, G-3 air, G-2 air, artillery air, and engineer air, to select remunerative air targets and to coordinate and control air missions."--CG, 104th Inf Div.

II COORDINATION WITH ARTILLERY AIR OBSERVER.

290. "We use the following method of effective cooperation between the division air support party officer and the artillery air observer: The air observer watches the target area during the time between the call for an air strike and the arrival of the planes, and informs the air support party officer if a change in the situation makes a change in the assigned target desirable. The air observer also reports to the air support party officer when the planes attack and with what results. The air support party officer in turn keeps the pilots informed of the accuracy of their attack and notifies them when the bombing or strafing is not in accordance with the briefing. The air observer also has been able to check the effectiveness of colored smoke used to mark targets. If the smoke blows away or becomes faint before being picked up by the fighter-bomber pilots, the air observer passes on this information. He often can assist the air support party officer in his vectoring by keeping him advised as to the movement and location of the fighter-bombers prior to the attack. Communication is from the air observer to his base set at the field, where the message, by remote control and direct line, is sent to the division fire direction center. The message is relayed from the fire direction center by direct line to the air support party officer."--Arty Air O, 28th Inf Div.

III AIR SUPPORT OFFICER STUDIES TARGETS FROM AIR.

291. "I go up in a liaison or artillery plane and study the targets and permanent terrain features prior to employing fighter-bombers for close-in missions. Knowledge of the appearance of the target areas from the air makes it much easier to brief the fighter-bomber pilots and to direct them to the targets without loss of time."--Air support party O, 2d Inf Div.

IV MARKING TARGETS.

292. Pilots watch for burst. "When we use colored smoke to mark enemy targets for air support, our air support officer contacts the planes and the artillery that is to mark the target. He gives the command to fire when the planes reach the target area and when the artillery announces 'on the way' the air support officer repeats this to the planes so that the pilots can watch for the burst. In less than a minute from the time 'on the way' is given to the planes the target is marked and the planes sweep in for bombing or strafing or both."--G-3, 5th Inf Div.

293. Use of pre-selected targets. "We brief our fighter-bomber pilots in the air by means of artillery smoke put down by prearrangement on selected points--towns and principal road junctions in the sector. To facilitate rapid placing of the smoke, the markers are given numbers which are furnished to the artillery with the coordinates. For example, if a road is to be reconnoitered, the marker nearest the point at which the reconnaissance is to

begin is called for by the air support officer and fired by the artillery. The flight leader is then briefed with reference to the marker. Colored smoke combinations and changes in the spacing of bursts prevent the enemy from duplicating our marks."--Air support O, 45th Inf Div.

294. Cubs drop smoke grenades. "Cub plane observers with the task of spotting for and orienting fighter-bombers sometimes have trouble getting the fighter-bomber pilots to see the targets on which the cub is briefing them. A successful solution has been to tape together three red smoke rifle grenades, pull all the pins, and drop them from the cub plane on a point near the target. The target location is then described with reference to the red smoke."--Air OP O, VI Corps.

295. Two rounds best. "Targets for bombing should be marked with two rounds of white phosphorus so that planes can distinguish the marking from other single rounds of white phosphorus being fired in the area."--39th FA Bn.

V SILENCING ANTIAIRCRAFT GUNS.

296. "After marking the target with smoke for fighter-bombers, and about one minute before the bombers make their run, we fire one or two volleys of time fire over the target area. This practice has been effective in silencing enemy antiaircraft and the pilots have been very appreciative."--Air support party O, 102d Inf Div.

VI TECHNIQUE OF MOTOR MOVEMENT WITH AIR SUPPORT.

297. Situation. "In a motorized advance, the 79th Infantry Division used the following methods for maintaining control and close air support. A cavalry group was protecting the division's front and right flank, and an armored division was marching on the left flank.

298. Communication. "The 79th Division moved in two columns with sections of the division reconnaissance troop attached to the heads of each column and to the armored division, so that contact could be maintained through the SCR 506. The SCR 508s in the M-8 armored cars of the sections were set to the frequency of the artillery liaison planes which covered the columns. In some instances these planes determined the method of advance of the columns.

299. Control. "The combat team commanders were in direct contact with the division commanders through the SCR 193. Combat teams moved from point to point on order of higher authority, usually the division commander with one column and the assistant division commander with the other.

300. Infantry movement. "Truck companies and trucks from the division and attached artillery were used to move the infantry. In some instances the motorized infantry moved so rapidly that there was an intermingling of columns with the armored division on the flank, and at other times they had to halt and wait for the cavalry to regain its distance ahead. The division chief of staff recommends that the cavalry in such a situation be given an ample head start, e.g. cavalry starting at daylight, infantry at 1300.

301. Air support. "The air support party usually remained with division headquarters, although it occasionally moved to the unit where the greatest difficulty was expected. Combat team commanders or the reconnaissance troop could get air support almost immediately by radio request to the armed reconnaissance flights which were covering the advancing columns. Requests often went from the cavalry group to our reconnaissance troop to the

division air support party to the planes. The armed reconnaissance flights also covered areas as requested by corps and division air support parties. The missions usually were flown by four or eight aircraft carrying 500-pound general purpose bombs and .50 caliber machine guns."--CG, 79th Inf Div.

VII FIGHTER-BOMBERS DROP MEDICAL SUPPLIES.

302. "Fighter-bombers dropped medical supplies to a unit cut off by enemy fire in a bridgehead during a river crossing operation. The area was too heavily covered with flak for cub planes to enter. Blood plasma, dressings and other medical supplies, securely wrapped in blankets, were placed in eight wing tanks, slit open for the purpose. The pilots were briefed thoroughly on the area occupied by the troops. The ground troops waved white articles of clothing and equipment at the point of drop. As other fighter-bombers gave them protection from enemy air activity, the four P-47s flew in just above tree top level and dropped six tanks exactly on the agreed location. The other two tanks failed to drop from the planes."--G-4, 90th Inf Div.

Chapter Fourteen

NOTES ON DEFENSE

I GOOD AND BAD PRACTICES.

303. These bring success. "A three-day defense of a main line of resistance against heavy attack taught us these rules:

a. "Keep at least one day's emergency food and water at all defensive positions.

b. "Locate battalion aid stations away from command posts. Jerry knows our habit of aid stations close to command posts.

c. "Clear all civilians out of small towns near the lines. They give information to the enemy. Some act as snipers.

d. "Don't fail to have a battalion command post guard. We used a 13-man squad attached to headquarters company and commanded by S-1. They were armed with light machine guns, submachine guns, M-1s, carbines, grenades and bazookas. Without this security our command post would have been wiped out.

e. "Keep extra SCR 300 and SCR 536 batteries on the position.

f. "Stress security on wire and radio."--CO, 1st Bn, 242d Inf Regt.

304. These bring disaster. "Some small units have suffered heavy losses while billeting in or defending towns chiefly because of poor planning and technique. Following are some specific faults:

a. "Failure to post and maintain an all around alert security, thus allowing the enemy to infiltrate.

b. "Failure to maintain tactical unity, due to dispersing elements throughout the town to obtain sleeping quarters.

c. "Failure to make advance plans for fires, including artillery, antitank, and mortars, to break up enemy attacks.

d. "Failure to establish adequate communication to alert units for action.

e. "Failure to use all weapons in defensive action."--CO, 222d Inf Regt.

II FOXHOLES.

305. "A three-man foxhole gives our front line soldiers maximum protection from cold, rain, and hostile fire. Except when under fire one man remains alert outside the rear entrance while two are resting. The holes are 8' x 4' x 6', covered with four layers of logs and dirt, and camouflaged. Three fire slits and a fire step are prepared on the forward side. Entrance is by a small hole in the rear which is kept covered by a shelter half or blanket. Cardboard box tops or other salvage material is used to keep the rain out and pine boughs or dry grass are placed on the floor."--Ex O, 2d Bn, 121st Inf Regt.

III DEFENSIVE FIRES.

306. Close-in artillery. a. "When organizing a defensive area for over 12 hours we plan mortar and artillery fires to fall from 50 to 75 yards in front of our forward positions. While the area is being organized, the fires are planned to fall 200 yards or more to the front, but are moved closer when the work is completed. All men are required to prepare deep foxholes with cover--preferably logs and dirt.

b. "The system has several advantages. Enemy patrols can be knocked out very close to our position without using small arms fire which would give away our dispositions; Germans can be captured easily when they rush forward to get out of the fires and--very important--it has sold the men on the effectiveness of mortar and artillery fire and made them more eager to follow concentrations closely in the attack."--CO, Co L, 13th Inf Regt.

307. Fire adjustment by infantry. "The ability of our infantry officers and noncommissioned officers to adjust artillery fire was a big factor in helping us inflict heavy casualties on the Germans in one attack. Prior to the attack, both theoretical and practical training had been given to classes of 35 to 40 infantry officers by our artillery officers. The infantry officers then conducted unit schools for the noncommissioned officers. This training helped to enable one infantry battalion to stop the attack of a German division. In one instance a five-man outpost destroyed an enemy company principally through their ability to adjust artillery fire. They called for 155mm howitzer fire within 50 yards of their positions. This fire killed 150 Germans without loss to the outpost."--CO, Co L, 109th Inf Regt.

308. Sometimes tracers help. "German prisoners attribute the failure of their attack on Bastogne, on the morning of 30 December, in large part to the lavish expenditure of tracer bullets by the defenders. All prisoners questioned stated that the illumination by the tracers made every soldier feel that he could not go further without being spotted and that morale was lowered considerably because every tracer bullet 'looked as if it were coming right at you.' Even enemy personnel that already had seen five years of warfare, including the Stalingrad battle, commented that the display was more frightening than anything they had experiences previously."--G-2 Periodic Report, Third Army.

309. Antiaircraft artillery half-tracks are effective. "During a recent attack, one 40mm gun and two M-16B half-tracks were placed on each flank of the division to provide harassing fire to discourage counterattacks. Guns placed on the south flank were sited for direct and indirect fire on the enemy's main supply road. The guns on the north flank delivered indirect fire on an enemy-held town, assembly areas, pillboxes, roads and junctions. Excellent results were obtained and activity on roads and in assembly areas was severely curtailed. Tree bursts obtained by the 40mm guns were particularly effective. Firing was limited to daylight hours to prevent tracers from disclosing the positions. Counterbattery fire was received from mortars and self-propelled guns, but as all weapons were dug in, there were no casualties."--447th AAA AW Bn.

IV TIPS ON NIGHT DEFENSE.

310. Use of white phosphorus. "White phosphorus shells fired beyond the main body of Germans attacking at night silhouetted the enemy soldiers and enabled our machine guns to break up the attack with accurate fire."--Fifth Army, (Italy).

311. Searchlight illumination. "Searchlights employed so that the beams shine just above the height of a man will cause individuals and vehicles to make shadows which are easily seen. This reduces the probability of surprise by the enemy in snow-covered terrain."--CG, 35th AAA Brigade.

312. Locating armor with tracers. "At night we emplaced a machine gun on either side of a tank destroyer. When hostile tanks were heard approaching, the machine guns fired tracers until ricochets indicated a tank was being hit. Both guns would then fire at the tank and the tank destroyer would aim at the point of the V made by the converging machine gun tracers."--Asst G-2, 101st AB Div.

V STOPPING ENEMY TANKS.

313. Keep mines handy. "We placed a small stack of mines near all road junctions and crossroads immediately behind the front lines in our area. The stacks were marked by placing a triangle of stakes and engineer tape around them and putting up a sign: 'For Road Blocks'. Anyone could then set up a hasty mine barrier when necessary."--AT Co, 330th Inf Regt.

314. Teamwork does the job. "Close teamwork among infantry, artillery, tank and tank destroyer units accounted for 69 enemy tanks and several other armored vehicles during attacks on Rockerath and Krinkelt. The antitank defense was coordinated as follows: Medium artillery took the enemy armor under fire before it reached our lines, to break up the tank formations. Our tanks, tank destroyers, and 57mm antitank guns then fired on the enemy tanks from the flank. Bazookas and other tank destroyers mopped up those that succeeded in infiltrating. Knocked out enemy tanks were destroyed later by setting them afire with a gasoline-oil mix and placing thermite grenades in the gun barrels."--38th Inf Regt.

315. Trapping single tanks. "Single German tanks, accompanied by infantry, sent out to probe roads at night were trapped in the following manner: An uncamouflaged 'daisy chain' of mines was put across the road about 100 yards in front of a band of carefully camouflaged mines covered by bazookas and a machine gun. The Germans, after removing the 'daisy chain', tended to feel that all was clear. Usually the tank hit the concealed mines, whereupon we opened fire on the infantry. If the concealed mines were discovered or failed to stop the tank, the bazooka men opened fire on it, while the machine gun fired on the infantry."--CO, 110th Inf Regt.

VI PROTECT YOUR OWN TANKS.

316. Keep the enemy away. "Usually only the tracks of a tank are damaged by a mine and it can be repaired and put into operation in a few days. The enemy knows this and tries to get close enough to set the tank on fire with a bazooka or grenades. The infantry must prevent this by protecting the tank with automatic fire.

317. Use the tank weapon. "The tank cannon may still function though the tank is out of action. Each rifle company should have some men trained to fire this weapon so its fire power will not be wasted. Two men in the tank are sufficient, a gunner and a loader." --CO, 3d Bn, 180th Inf Regt.

VII DECEPTION AIDS DELAY.

318. "During a period when our supply of mines and bazooka ammunition was low, we slowed the German advance by keeping them guessing which road blocks were mined and defended. At undefended road blocks we scratched up the ground, put in dummy trip wires, and left men to fire a few shots before withdrawing. The enemy was forced to be cautious as some road blocks that appeared exactly the same were mined and defended."--CO, 110th Inf Regt.

VIII LOCATING ENEMY PARACHUTISTS.

319. "Artillery air observation posts were valuable in locating enemy parachutes caught in trees, thereby giving us an indication of the pattern of the drop."--Security Comdr, VII Corps.

IX COORDINATED OUTPOST ACTION.

320. "While in a defensive position we numbered our outposts and ran wire between them. One night an enemy patrol came towards post number one. This post, to avoid disclosing its position, called post number two and had it fire a flare. The flare disclosed the enemy patrol and it was destroyed."--3d Plat, Co B, 116th Inf Regt.

X HOW TO CHALLENGE.

321. "One unexpected shout is hard to locate; a second, expected, can usually be spotted. Sentries can protect themselves by letting a man they are about to challenge get fairly close--25 yards or less--and then shouting 'Halt' just once."--Sgt Homer A. East, 2d Inf Regt.

XI NIGHT FIRING SUGGESTION.

322. "Whenever possible at night we use hand grenades rather than small arms. Hand grenades don't give away the position."--Sgt Homer A. East, 2d Inf Regt.

Chapter Fifteen

MEDICAL NOTES

I CONTINUAL TRAINING IN SELF FIRST AID NECESSARY.

323. "Few wounded men apply their own aid dressings, but wait until the aid men arrive. The individual line soldier's responsibility for first aid must be indoctrinated continually."--Surgeon, XIX Corps.

II INFANTRY TRAINING FOR MEDICS.

324. "Medical personnel should have more infantry training, especially in such subjects as cover and concealment, map and compass work, and other subjects that will enable such personnel to protect themselves from enemy fire."--Regtl Surgeon, 9th Inf Div..

III OPERATION OF AN INFANTRY BATTALION MEDICAL SECTION.

Note: Details of the SOP of a battalion medical section credited with having achieved superior results during six months of combat are given below:

325. Preparatory steps. a. "The battalion S-2 keeps us supplied with aerial photographs and tactical maps. As soon as a field order is received, we study the maps, call a meeting of all medical personnel and give them complete information and announce a tentative evacuation plan. Reconnaissance is then made by litter squad leaders of evacuation routes.

b. "Communication by telephone and SCR 300 is established whenever possible. The radio operator is furnished with maps and photographs and is responsible for keeping abreast of the situation by monitoring. The aid station operates in the radio net as a regular station but is used only when wire lines are very crowded. The radio is operated by the clerk on duty, assisted by the section leader when necessary.

326. Organization for operation. "Aid station personnel are divided into two groups, each consisting of a surgical technician, a medical technician, a clerk-radio operator, and a driver. Thus organized the teams can operate simultaneously at two different locations when casualties are heavy or they can work alternately, permitting one team to rest in reserve when casualties are light.

327. Conduct during action. a. "The aid station is located as close as possible to the anticipated area of maximum casualty density. It is frequently ahead of the battalion command post. On one occasion its forward element was set up on the line of departure and a Red Cross prominently displayed. This permitted many of the advancing infantrymen to note its location with the result that many of the less seriously wounded reached it unaided, instead of waiting for litters. On another occasion half the aid station moved to the objective with the attacking companies carrying medical supplies by pack because of the threat of minefields.

b. "The radio and telephone operators help direct litter bearers and call the ambulance forward from its protected location only when required.

c. "The noncommissioned officer in charge of each litter squad directs his squad, keeps informed of the situation, and passes information to the aid station. Normally the litter squads are well forward, two working and one resting. When the aid station cannot get well forward, advanced litter stations are established, usually in protected areas

near company command posts. At times litters are left near company command posts, and the infantry aids in removing casualties. Each litter squad has a telephone and test clips, thus permitting them to tap battalion wire lines and keep in touch with forward units and with the aid station.

328. Reinforcements. "Reinforcements receive a period of training at the aid station and as members of litter squads before being placed in the line as company aid men. They are then assigned, if practicable during a rest period, to a unit with a 'battle-wise' aid man."--Surgeon and Asst Surgeon, 1st Bn, 116th Inf Regt.

IV AID STATION RADIO.

329. "We have a radio in each battalion aid station operating in the battalion net. This permits litter bearers to rest frequently and remain on call at the aid station instead of continuously searching the field for casualties. Each company calls for litter bearers as required. The litter bearers ride forward on the jeep as far as possible, then go on foot to the casualty and bring him to the jeep--thus getting the casualty rapidly to the aid station. If there are many casualties, the litter bearers establish a collecting point accessible to the jeep, and the jeep ambulance transports the patients quickly to the aid station."--28th Inf Div.

V FORWARD COLLECTING POINT.

330. "In the attack we have a battalion forward collecting point for casualties and keep one litter team and a litter jeep there. It has communication with the battalion and company command posts by SCR 300 and, when possible, by wire. If a casualty needs blood plasma, the company commander can tell us when he reports the casualty, and the plasma can be brought from the aid station before the man arrives."--Bn Surgeon, 405th Inf Regt.

VI LITTERS IN EACH COMPANY.

331. "Evacuation of wounded has been expedited and lives saved by furnishing one litter to each company headquarters. When a man is wounded, instead of calling for battalion litter bearers and awaiting their arrival, company personnel can evacuate him to a place out of danger and more accessible to the battalion litter bearers or stretcher jeeps. It also helps morale to move wounded quickly from near those still fighting."--39th Inf Regt.

VII AMBULANCE ROUTE MARKERS.

332. "Consideration should be given to providing an efficient ambulance route marking system from the front to clearing stations. Many ambulance drivers lose their way, and much time is lost in reaching clearing stations."--1st Inf Div.

VIII EVACUATION IN ARMORED UNITS

333. Aid man uses jeep. "Each medium tank company is furnished an aid man in a ¼-ton truck who evacuates casualties to the battalion aid station. If casualties are heavy, additional vehicles may be dispatched, or the battalion surgeon may go forward to treat the casualties. An advantage of this system is that travel from front to rear and return presents fewer hazards than travel laterally from company to company."--Surgeon, 10th Tk. Bn.

334. Jeep and half-track combination. "Jeeps with litter-racks work well forward of the battalion aid station along the axis of advance. When a tank is hit, the medical officer in the jeep immediately radios for a half-track ambulance which removes the wounded to the aid station. The aid station is fairly mobile and is located near the battalion command post. Two medical officers are assigned to each battalion in action."--Surgeon, 2d Armd Div.

335. By light tank. "When it is impossible for the medics to evacuate the wounded in the normal way we put a stretcher on the back of a light tank and evacuate wounded by that means. The entire regiment uses this system."--CO, 1st Bn, 66th Armd Regt.

IX RACK FOR BLANKETS.

336. "A stout wire along each side of the ambulance compartment provides a convenient and clean place to carry blankets. In cold weather and when the patient's clothing is usually wet and must be removed, we find it advisable to carry 16 blankets instead of the usual 12."--EM of the 104th Med Bn.

X CLEARING STATIONS AND FIELD HOSPITALS.

337. Hospitals. "The field hospital, set up by platoons in the vicinity of clearing stations, is the best place for effective surgery. This unit, however, must be well forward. The less the distance between the place of injury and the field hospital for all non-transportable cases, the greater the incidence of recovery. We have received several severely wounded men whom we were able to save by prompt surgery and by administering plasma and penicillin within an hour and a half from the time of injury. These cases could not have been saved had the time lag been four or five hours. If we can always stay within five miles of the front, the death rate can be much reduced.

338. Clearing stations. "Some divisions keep their clearing stations entirely too far to the rear. On one occasion we were forced to remain 15 miles behind the lines or set up forward of the clearing stations."--CO, 2d Plat, 51st Field Hospital.

XI VARIATIONS IN ORGANIZATION FOR DENTAL SERVICE.

339. In rear area during fast-moving operations. "During fast-moving operations, we withdraw the regimental dental officers to the rear echelon where they are used to service the supporting units of the division. When the tactical situation permits, clinics of one to eight dental officers are placed with a regiment to complete the necessary work in minimum time."--Div Surgeon, 3d Inf Div.

340. Continuous forward area service. "There was always a need for dental service in the forward area. We provided it at the regimental aid station where treatment was given to 584 patients in one month. We treated personnel of adjacent units which were without facilities in the forward area, as well as our own personnel. This procedure permitted timely dental treatment to the maximum number of troops with a minimum loss of time."--Dental Surgeon, 320th Inf Regt.

341. Coordination of division dentists. "We have a system which permits maximum continuous dental treatment, regardless of the tactical situation. It works like this: Infantry regimental dentists set up in the regimental rest areas. There they both provide dental treatment and help supervise the area. The engineer battalion dental officer operates a prosthetic laboratory in the division rest area where 55 men go daily to receive treatment and to rest. The division artillery dental officer operates a clinic by

appointment at the artillery headquarters aid station. The special troops dental officer remains with the division rear echelon, treats all special troops and makes a dental survey of reinforcements before they go forward, treating them as required."--Dental Surgeon, 100th Inf Div.

Chapter Sixteen

COMMUNICATION NOTES

I TESTING RADIOS UNDER OPERATING CONDITIONS.

342. "Radios used between various arms should be tested under operating conditions before being employed in action. For example, radios of forward observers riding in tanks have not worked because the crystals were not set and the radio tested with the tank moving." --Ex O, 411th Inf Regt.

II RADIO EXPEDIENTS.

343. Eliminating SCR 300 handset. "A throat microphone and a headset that covers one ear is better than the regular handset for the SCR 300 operator. With them he can hear his radio and other instructions close by and still act for his personal safety without being hindered by a handset."--Co F, 405th Inf Regt.

344. Improvised antenna. a. "Improved range and reception with the SCR 300 resulted whenever we were able to use local material as an antenna extension. Broken telephone or electric lines worked well and we even used water pipe and radiators in houses with good results."--CO, 3rd Bn, 378th Inf Regt.

b. "We avoid breaking the SCR 300 antenna when in heavy brush or woods by substituting a three or four-foot piece of German wire from the antenna socket to the strap on the operator's steel helmet. This gives excellent reception and transmission."--CO, Co A, 338d Inf Regt.

c. "When setting up in buildings we get better reception by putting the aerial of the SCR 300 out of a second-story window and running W-130 wire from the base of the aerial to the aerial socket in the radio. The radio can then be placed anywhere in the building." --Com Sgt, Co D, 333d Inf Regt.

(Note: The Signal Section, European Theater of Operations, United States Army, points out that the SCR 300 has a tuned antenna and any variation in length will not affect reception but may reduce the transmission range of the set.)

345. Loop antenna for SCR 610. "A directional loop antenna for the SCR 610 can be made from the mast sections of the set. It strengthens weak ground signals and does not affect communication with liaison planes. The loop antenna can be made from the three mast sections MS-53 and one mast section MS-51 and can be mounted on the mast base MP-49. When operating, the loop is turned until the signal is strongest."--S/Sgt David H. Wainright, Hq Btry, 283d FA Bn.

346. Extension cords. "Extension cords about 30 feet long can be made for SCR 600 series radio sets from cable that comes with the sets. Using the extension it is possible to have the radio in the open and operate it from cover."--S-3, 224th FA Bn.

347. Reducing SCR 536 receiver noise. "When using the SCR 536 on patrols, the antenna is kept nearly all the way down, except when transmitting. This reduces receiver noises which might be overheard by the enemy."--CO, 3d Bn, 378th Inf Regt.

348. Mounting SCR 610 on right side of vehicle. a. "We have gained much needed space in ¼-ton trucks equipped with SCR 610s by mounting the radios immediately behind the right front seat. The radio is placed flush with the side of the truck, with the loudspeaker and

switch panel facing the front. This makes it easier for the vehicle commander--usually in the right front seat--to hear, and permits using the shortest and most direct route for the power cord from the power unit to the junction box or the storage battery. When the driver is also the radio operator, a clip for holding the microphone is bolted to the dashboard.

b. "To assure the proper length lead-in, the antenna also must be installed on the right, where it is more susceptible to road obstructions and branches. Some protection can be afforded it by mounting the spare tire on the right, and by bending the antenna forward toward the center of the radiator and tying it down."--Hq, 180th FA Bn.

III RADIO DISTRIBUTION.

349. Emergency relay station. "An SCR 300 on the regimental channel in a liaison plane is invaluable for relay."--Italy.

350. SCR 610 for antitank and cannon companies. "We have obtained SCR 610s for use within our antitank and cannon companies. In addition to providing longer range communication for these companies, this also permits a possible alternate means for the regiment to contact the battalions. When the cannon company forward observer is at the battalion command post, the cannon company channel can be used to reach the battalion commanding officer." --47th Inf Regt.

351. SCR 284 for battalion supply officer. "An SCR 284 for the battalion supply officer, netted with the regimental service train and regimental command post, will expedite battalion supply activities. In one instance use of radio resulted in the movement of emergency ammunition from the dump 20 minutes before the foot messenger arrived with the request for it." --CO, 116th Inf Regt.

352. SCR 300s for ammunition dump and for aid station. "One battalion uses the SCR 300 for communication with the battalion ammunition dump to direct the movement of resupply quickly wherever needed. They recommend placing an SCR 300, when available, at the battalion aid station to aid in the evacuation of wounded."--83d Inf Div.

353. Relay for the battalion commander. "Two SCR 300s and one SCR 610 are carried in the battalion command group in fast-moving situations. The battalion commander, with his S-2 or S-3 and one SCR 300, moves close behind the assault companies. He contacts the remainder of the command group directly with the SCR 300 and the regiment by relay through the SCR 610. When the signal on the SCR 300 becomes faint, he directs the rest of the command group be moved forward."--CO, 1st Bn, 405th Inf Regt.

IV COMMUNICATION BETWEEN ARMS.

354. Integrating tank destroyer communications with those of an armored division. "By placing an SCR 508 with each tank destroyer company and an SCR 510 with each platoon we enable the tank destroyer units to contact on division channels the armored units to which they are attached."--Signal O, 5th Armd Div.

355. SCR 300s coordinate tank defense. "We lend an SCR 300 to the attached tank destroyer battalion and to the artillery liaison officer. The battalion and rifle companies and the tank destroyers are on the same channel. In a recent tank attack the forward companies adjusted fire of the tank destroyers while the artillery officer, listening in, brought in artillery fire on the same targets; 24 out of 27 enemy tanks were destroyed." --CO, 3d Bn, 134th Inf Regt.

356. Tank radios for infantry--tank coordination. "We attach a liaison officer and a half-track equipped with an SCR 508 to the headquarters of each infantry regiment with which we work. They provide communication between the regimental headquarters and the tank battalion and furnish a point through which supplies can be forwarded to front line tanks. Because of their power they sometimes are used for communication, through other tank sets, between the infantry regimental and battalion headquarters."--CO, 761st Tk Bn.

357. Tanks, tank destroyers, and artillery use common channel. "Communication between tanks, tank destroyers, and the artillery fire direction center is established by using a common frequency in the 10-channel overlap of the SCR 500 and SCR 600 series radios. The artillery forward observer with the leading infantry element also can use this channel in an emergency."--CO, 736th Tk Bn.

V QUICK REPORTS ON FRONT LINE LOCATIONS.

358. Extra sets permit listening in on observation plane channel. "The division artillery furnishes an SCR 610 to each regiment and the regiments, tank destroyer battalions, and all forward observers monitor the artillery observation plane channel. On occasion this has resulted in learning the location of our front lines as much as an hour before it could have been obtained by ground means."--S-3, 83d Div Arty.

359. Air observer spots flares. "We plotted our positions in thick woods by having liaison planes observe and report the location of flares fired by front line troops. When the observer was ready he would send a code message by radio, and the front line companies would fire their signals. The observer would then give exact locations by coordinates. This helped the companies orient themselves and furnished the basis for accurate overlays for higher headquarters."--S-3, 3d Bn, 134th Inf Regt.

VI WIRE LAYING TIPS.

360. Pass on copy of line route map. "We have speeded wire repair by making it SOP for all units to send a line route map with the wire crew to the wire chief of the unit to which the line is being laid. If such a map is not available, or security makes its use inadvisable the wire crew makes contact with the wire chief receiving the line and marks the route on his map. This facilitates the work of repair crews."--Com O, 188th FA Group.

361. Laying W-130 circuits. a. "One fast method of elevating W-130 wire was to slash trees at about shoulder height and lay wire in the gash between the trunk and the peeled-back bark. This obviated making a tie, which was the most constant cause of wire 'shorts'."
--WD Combat Lessons.

b. "Laying a sound-powered line in a circle--a complete circuit--will prevent its going out in case of a break in the line."--CO, AT Co, 377th Inf Regt.

362. Marking wire line tags. "Wire line tags should be either punched, painted, or cut in distinctive shapes. Written identification on the tags usually becomes unreadable in wet weather."--29th Inf Div.

363. Projecting wire across a stream with grenades or bazooka rounds. a. "The rifle grenade will carry W-110 wire from 100 to 125 yards. If the safety pin is pulled the explosion of the grenade will destroy about ten feet of wire; if the pin is not pulled disposal of the round is necessary.

b. "When using a bazooka round, the round is not removed from the cardboard case--the nose cap of the case is removed and a slot cut in the side of the case back to the fins of the round. The bottom end of the case is left in to prevent the round from sliding through.

The case is taped to a tree or post at the desired angle. A stick long enough to reach the ground is taped to the lower end of the case to serve as a brace. The wire to be projected is tied to the stem of the rocket through the slot in the case and is coiled on the ground nearby in figure-eights. The rocket is fired by a battery which, for safety, should be about ten yards away. With a 30° to 35 degree elevation the rocket will carry W-110 wire about 180 yards and W-130 wire about 225 yards."--5th Sig Co.

364. Packboard wire carrier. a. "A packboard wire carrier from which wire unreels from a man's back was made from an RL-27-B axle, a DR-4 reel (made 10 pounds lighter by cutting the metal from between the spokes) and a pike pole. The axle is cut and fitted into a bearing housing, which is welded to strap iron braces bolted to a plywood packboard. A pike roller mounted on a pivot that swings through a 90-degree arc at the bottom of the packboard prevents the wire from kinking.

b. "The first man of the regular two-man team carries this special reel. The second man uses a packboard to carry wire that has been removed from its reel and wound for the packboard reel. When the first wire pays out, this second load is merely slipped on to the wire carrier on the first packboard.

c. "Elimination of the second reel lightens the load 22 pounds. An additional half mile of W-110 wire can be carried by the two man team. The two men also have their hands free for wire tying, climbing, and using their weapons."--37th Inf Div (Pacific Theater).

365. Wire laid by airplane. "A wire reel attached to a cub airplane was used by the 6th Field Artillery Group in Italy to lay wire quickly over difficult terrain. On one occasion wire was laid over a mountain to a point three miles away in a very few minutes, a job that would have taken several hours by wire truck. The reel was designed, built and attached to the plane by the chief mechanic of the group's air section."--CO, 6th Arty Gp.

VII PROTECTION FOR WIRE TEAMS.

366. Diamond formation. "Our wire teams use a diamond formation for protection. The corporal stays out in front, reconnoitering and making frequent halts to observe for signs of the enemy. The wire-laying group consists of a jeep with a driver and one man to lay the wire or two men with an RL-27 reel. It follows the corporal. The fourth man, following at about 100 yards, polices, ties, tags and tests the wire and acts as get-away man. If available, two additional men are used for flank protection."--Hq, 116th Inf Regt.

367. Wire team moves in center of unit. "Our practice of having a wire team move in the center of each assault unit has several advantages. It assures continuous communication with the unit, gives the wire men protection, and in night operations insures that they do not get lost. Result--we have not lost one wire man because of enemy small arms fire."
--CO, 2d Bn, 415th Inf Regt.

368. Pick defiladed areas to make splices. "Wire-laying parties should play safe and stop to make wire splices between reels while they are in defiladed areas, even though all the wire has not been used. Splices are often made in exposed areas simply because the reel runs out of wire at that point."--Co D, 2d Inf Regt.

VIII SOUND-POWERED TELEPHONE FOR OBSERVERS.

369. "Providing each forward observer two sound-powered phones and a small reel of W-130 wire permits him to remain at his vantage point while his radio operator transmits from the most suitable position for his radio."--100th Inf Div.

IX SOUND-POWERED SWITCHBOARDS.

370. "We improvised a satisfactory sound-powered switchboard and eliminated the need for three or four handsets in the command post. The board is made from radio repair wire, stove bolts, test clips, diaphragms from sound-powered telephones, and a switchbox--or improvised switches. Each incoming line is attached to the board by test clips and is connected on the board to a diaphragm for signalling and a switch to connect it to the handset at the board. To call from one of the platoons a man simply whistles into his phone and the operator at the board throws the switch corresponding to the diaphragm responding to the signal."--Lt, Co H, 407th Inf Regt.

X SIGNAL LIGHTS FOR SWITCHBOARDS.

371. "Cords on switchboards BD-91 and BD-96 obstruct operators' view of supervision and line signals during heavy traffic. With headset HS-30, audible signals are unsatisfactory. By modifying the night alarm circuit to include two lights, one connected to the supervisory signal, the other to the line signal, a visual signal is provided. Lights should be mounted on the front panel, one on each side of the dial. With the supervisory light red and the line signal the natural color, operators soon become efficient in operating by this code." --99th Inf Div.

XI REPAIR OF FIELD TELEPHONES.

372. Maximum use of batteries. "New but defective BA-70 and BA-30 radio batteries sometimes can be made to work by a simple expedient. Remove the battery from the radio, cut around the terminal base with a knife, lift up the base, and reconnect any of the wires found broken loose--the usual cause of such trouble.

373. Don't throw a telephone away. "Certain damaged EE-8 telephones often can be made to work as follows: If the L-1 terminal only is damaged, one strand of line wire can be changed to the 'battery minus' post and, with the other strand on the L-2 connection, the phone will work satisfactorily. If both the L-1 and L-2 terminals are damaged, fasten the black wire from the handset to the positive pole and the white wire to the negative pole of the BA-30 batteries; then connect the line wire strands on the 'battery plus' and 'battery minus' terminals. This has worked up to five miles."--116th Inf Regt.

XII DETECTION OF WIRE TAPPING.

374. "Tests were conducted with both German and American telephones to determine whether or not the daily line readings would detect an instrument on the line. It was found that the combined use of the open circuit resistance, capacitance, and ground readings were sufficient to detect any normally available line-tapping equipment."--57th Sig Bn.

XIII USE OF PANELS.

375. Only front line units should use. "Be careful that only the front lines display panels. Once our own planes started strafing our command posts and everybody started putting out panels. The air never did know where the front lines were. If you have to use smoke, red smoke is best."--G-3, 4th Inf Div.

376. Air OPs keep track of infantry during advance. a. "Cerise panels were used by front line infantry formations to identify themselves to air OPs in an attack through woods. The success of this method has led to its adoption by all our infantry regiments." --CG, 83d Inf Div.

b. "It is difficult for our artillery air OPs to see our infantrymen when they move cross-country or in split columns along roads. In order to assist the observers we have adopted the practice of having a panel carried by the first squad in each platoon. On one occasion one foot of panel held up from a dugout was sufficient to enable the observer to spot our troops."--Lt, 229th FA Bn.

XIV SLIDEX CODE.

377. "We had trouble using slidex when we depended upon one person to operate it. There were so many mistakes that it was a definite hindrance. We remedied this fault by having two persons--one to check the other. This has eliminated mistakes, and we now consider slidex our best code."--Tr Comdr, 6th Cav Gp.

XV SIGNAL REPAIR TEAMS.

378. "Once each month a repair team from the telephone maintenance group of the division signal company visits all regiments, infantry and artillery battalions and miscellaneous units to inspect signal equipment. Only minor repairs are made, major work being scheduled for the repair shop. Aside from the actual repairs, benefits of this system are:

a. "It provides a check on first echelon maintenance.

b. "It permits scheduling of major overhauls so as to insure efficient use of the repair shop.

c. "It affords an opportunity to review and make appropriate changes in operating methods.

d. "It increases the units' confidence in the service being furnished by the signal company."--XIX Corps.

Chapter Seventeen

ENGINEER NOTES

I TWO VIEWS ON METHODS OF ENGINEER SUPPORT.

379. One company per regiment. "We have an SOP which we believe improves the effectiveness of engineer support of the infantry. One of our companies is assigned to each regimental combat team and keeps a liaison officer at regimental headquarters. An engineer platoon leader with a squad equipped with shovels and mine detectors is assigned to each infantry battalion and is kept ready to move out--usually on mine removal--without delay. The remainder of the company is held in readiness to reinforce the squads or perform other tasks. A tank dozer is given to the engineer party with the leading battalion or other battalion moving down the main supply route."--CO, 111th Engr Combat Bn.

380. Centralized control. a. "The most effective engineer support for an infantry division is obtained by attaching the minimum number of engineers to subordinate units of the division and employing the maximum number under control of the division engineer. When attachment is essential a good solution is to attach a platoon of engineers to a combat team and hold the balance of the company in support of the combat team, under control of the division engineer.

b. "The advantage of this policy over a standard policy of attaching engineer companies to combat teams, engineer platoons to infantry battalions, etc, is that the bulk of the engineer troops remain under the man who is best qualified to employ them for these reasons:

(1) "He understands more fully their capabilities and limitations.

(2) "He has a better picture of the over-all engineer needs of the division.

(3) "He can center their efforts on the more important engineer tasks and avoid wasting their technical skill on inconsequential tasks and those for which the engineers are not specially qualified."--V Corps Engr and CO, 117lst Engr Combat Gp.

II TRAINING.

381. For combat role. "The commander of an engineer combat battalion committed in a defensive role as infantry during a German counteroffensive believes that the following practices would help prepare engineer units for such emergencies:

a. "Train as many men as possible with bazookas and machine guns and continue to give short refresher periods of instruction. All personnel should be familiar with these weapons.

b. "Train a large number of men to lay and repair field wire. When woods made our radios ineffective we had to depend on wire for communication. Each company and platoon should carry at least one-half mile of combat wire and one field phone.

c. "Mount litter racks on at least one ¼-ton truck per company."--168th Engr Combat Bn.

382. Bulldozer operators. "Bulldozer operators must be trained to construct bypasses at night. The operator must be able to feel the working of the blade without seeing it."--Engr Bn, Italy.

III TIPS FROM A GROUP COMMANDER.

383. Traffic control at bridge sites. "The engineer commander of the bridge construction crew must enforce local traffic control at the construction site. Congestion caused by casual sightseers and parked vehicles of units not concerned with the construction, and interference caused by those who won't wait for bridge completion before crossing, make rapid construction difficult. Cooperation of tactical commanders must be sought to avoid this.

384. Foundations and lay-outs. "It pays dividends to take the time to carefully measure the bridge span and carefully lay out the footings for Bailey bridge rollers. Many hours can be lost by careless work on lay-outs.

385. Time estimates. "We have been too optimistic in evaluating our capabilities for completion of engineer tasks. The estimated times given in Field Manuals are based on ideal conditions and assume materials are on the site. Important tactical decisions rest on these estimates so they must be correct, based on conditions at the site.

386. Small tool dumps. "Many tools are lost by being carelessly thrown about, particularly at night. A small tool dump supervised by a noncommissioned officer should be established at each work site and small tools returned to it when not in use.

387. Reserves. "The engineer commander must always hold out a reserve, including technical specialists, ready to take over any phase of the work in the event of mishap.

388. Communications and control. "Don't overlook communications. Telephone communication between the work site and the forward assembly areas has proved invaluable in exercising control over the work.

389. Security. "The engineer commander must guard against surprise enemy attacks. Establishment of a small bridgehead is essential, including air guards and covered positions to be used in case of enemy fire."--CO, 1106th Engr Combat Gp.

IV TANK RETRIEVER FOR REMOVING ABATIS.

390. "A tank retriever with a large grappling hook was used to remove enemy abatis protected by anti-personnel mines and small arms fire. The retriever would pull the trees away one at a time to a covered position where they could be disengaged from the hook. Two modifications to increase the effectiveness of the device have been planned but not tested:

a. "Flattening the contour of the prongs and filing down the points on the hook to permit disengaging the trees from the hook without assistance from outside the tank.

b. "Welding, on older tank retrievers with a short boom, an 'A' frame over which the cable would run, to hold the grappling hook farther from the tank."--CO, 2d Engr Combat Bn.

V MINE CLEARING.

391. "When road junctions were mined, possible by-passes often were mined also. It was usually faster to clear the road than to prepare a by-pass."--AGF Board, Italy.

VI RECONNAISSANCE BY CUB PLANE.

392. "The use of cub planes for prompt reconnaissance of routes of communication proved to be of inestimable value. Low altitude reconnaissance, including pictures, permitted early and accurate decisions by the engineer as to which bridges should be reconstructed and the type of reconstruction to be attempted."--Seventh Army.

VII FUZE CRIMPING.

393. "Misfires of explosive charges have frequently resulted from applying too much pressure when crimping caps with the new type crimpers. A recent test indicated that best results are obtained by crimping just enough to hold the cap to the fuze. Crimping with full pressure so constricts the powder train that the spark is stopped."--Engr, XIX Corps.

VIII RIVER CROSSING TIPS.

394. Getting cable across a swift river. "We had little success getting cables across the river at first but finally used the following method successfully with both 1/4" and 1/2" steel cables:

a. "Cable was wound on two reels.

b. "One reel was kept on the near shore and the other placed in the back of a boat.

c. "Eight husky and experienced paddlers paddled straight from the shore and kept going without hesitation.

d. "Cable from the reel on shore was played out until the weight of the cable began to drag on the boat; from this point on the cable from the reel on the boat was played out.

395. Miscellaneous. a. "Keeping away from former bridge sites probably averted losses as the enemy seemed to be well zeroed in on them.

b. "Engineer--infantry coordination was good because we had a complete telephone system tying in the engineer group, the infantry regiment, the engineer battalions and the crossing sites. Some engineer battalions had their command posts adjacent to those of the infantry.

c. "Antiaircraft searchlight beams reflected from clouds gave us the same light as a medium moon."--Ex Os, 1135th and 1103d Engr Combat Gps.

d. "A ferry for a combat-loaded and sandbagged M-4 tank should include five M-2 treadway floats instead of four as specified."--CO, 308th Engr Combat Bn.

IX PREFABRICATED SHELTERS FOR FRONT LINE TROOPS.

396. "We have built prefabricated shelters which can be moved up quickly and used by the infantry for warming men in the line. They are made in sections from standard lumber and constructed with a slide fit so they can be put together without noise. The shelters are dug in about three feet and sandbagged, and when completed measure 6' x 8' x 5'. Straw or other available materials are used to cover the floor and small stoves provide warmth."--CO, 319th Engr Combat Bn.

Chapter Eighteen

TRICKS AND RUSES

NOTE: Items below are based on experiences against the Germans but similar trickery may be expected from any enemy.

I DECEPTIVE TRICKS.

397. "Captured documents indicate that German soldiers have been trained in certain deceptive tricks. Following are some examples of such instructions:

a. "Put a shot through the helmet to increase the impression of being dead.

b. "Cut telephone cables at night and lead one end into an ambush, so the enemy line party can be killed or captured.

c. "Put up boards with 'Danger-Mines' or a death's head on them in an area and fence off the area with wire. Then make tracks around the dummy minefield and mine the tracks. Obvious footpaths should be mined with unusually careful camouflage.

d. "Lure the enemy into ambush with captured motor vehicles.

e. "When encountering the enemy suddenly in woods open fire at random, fall to the earth and yell like mad while still under cover. This will make him open fire and give away his location and strength.

f. "Simulate digging, especially when you are going to attack, by such means as rattling wood, driving in pickets, and shoveling sand.

g. "Spread piles of gasoline soaked straw or wood in front of your position. If the enemy approaches at night the area can be illuminated by firing at these piles and lighting them."--Periodic Report, VIII Corps Arty.

II DECEIVING OUTPOSTS.

398. "There is some evidence that the Germans used reproduction machines to simulate vehicle noises. On two occasions air reconnaissance could find nothing in locations where reliable ground reports had indicated sounds of considerable motor transport."--CO, 3d Bn, 12th Inf Regt.

III THE OLD DUMMY TRICK.

399. "To draw our fire during the day the enemy fixed up and exposed a dummy, fully dressed and with a shiny buckle on the uniform."--Ex O, 3d Cav Gp.

IV MINE AND TIME BOMB TRICKS.

400. Faked camouflage. "An intentionally poorly camouflaged 'S' mine was found by the side of a road. A mine detector was used by the engineer who moved forward to remove it. He found that a circle of well-hidden 'S' mines surrounded the conspicuous mine. His caution in using the mine detector saved him."--1120th Engr Group.

401. Near railroads. "The enemy frequently places antitank mines on roads near railroad crossings where the presence of the rails makes the mine detector useless."--CO, Co C, 35th Engr Bn.

402. Around wire cuts. "Germans use these two tricks to cause casualties among wire crews:

a. "An 'S' mine is buried with a ZZ 35 igniter under a field wire line so a pull on the wire by a man checking will set off the mine.

b. "The wire line is cut, then Schu-mines are placed in a circle around the cut."--XX Corps.

403. Double explosion. "The Germans have laid effective traps by setting two time bombs for detonation within a few moments of each other. On one occasion two such bombs, placed under sidewalks directly across the street from each other, went off fifty seconds apart. The second explosion, as planned, caught some personnel who had run to investigate the damage and assist those injured by the first blast."--WD Board Report.

V PLAY IT SAFE.

404. "Never go forward to accept a surrender. Stay down and make them come to you."--Men of Co E., 30th Inf Regt.

VI CIVILIANS MAY PLACE BOOBY TRAPS.

405. "We sustained several casualties when members of a bomb disposal squad lifted a box of TNT from a pile of enemy explosives which had been inspected two days before and found free of booby traps. The box of TNT had apparently been booby-trapped since its last inspection. Such casualties will continue unless all troops realize that we are now in a hostile country."--G-2 Report, Third U.S. Army.

Chapter Nineteen

SUPPLY AND MAINTENANCE

I HOT FOOD FOR THE FRONT LINE.

406. Dugouts for reheating. "Put heating units in defiladed dugouts in rear of company positions. As meals are brought up, reheat them in these dugouts before sending them to front line platoons."--99th Inf Div.

407. Easily carried containers. "We get hot food to front line units in places inaccessible to transportation by heating C ration cans in boiling water, putting the cans in 155mm shell containers, and strapping three containers on a packboard. The food stays hot for four hours. Hot water for cocoa and coffee also is sent up on packboards in five-gallon water cans. Each can is wrapped in two blankets to keep the water hot."--Asst Div G-4, (Italy).

408. Hot and sterilized mess gear. "Mess gear of front line troops is collected and taken to the kitchens where it is washed by mess personnel. When the next hot meal goes forward, mess gear is sent along in 32-gallon cans of boiling water, and arrives hot and sterilized."--Div Med Inspector, 87th Inf Div.

II CLOTHING AND BLANKETS FOR FRONT LINE TROOPS.

409. Convenient way to carry overcoats. "We have obtained carrying straps from field bags for each of our men. Overcoats can now be carried conveniently by tieing them in small bundles, attaching them to the D-rings on the carrying straps, and slinging them over the right shoulder.

410. Flexible arrangement for providing individual rolls. "We carry on our transportation three types of rolls for each squad, all or any of which can be delivered if transportation is available. One contains two blankets per man, another shelter halves, and the third a sleeping bag and one blanket per man."--CO, 9th Inf Regt.

411. Providing clean clothes. "We have accumulated enough clothing to maintain a stock of approximately 50 duffle bags of shirts, trousers and underwear for each battalion. Each item is classified as large, medium or small and each duffle bag contains only items of the same type and size. Most of the duffle bags are carried on the regimental train but each battalion carries a limited number to take care of emergency needs. When a unit desires clean clothing the battalion S-4 draws the necessary bags and takes them to the company where the supply sergeant issues the clothing, and returns the dirty clothing to the regimental S-4 through the battalion S-4. It is laundered and then sorted and put back in the bags by regimental supply personnel. The system makes it possible to have a complete change of clean and dry clothing for every man in the regiment. Attached units have approximately ten duffle bags each and are responsible for their own sizing and laundering."--S-4, 314th Inf Regt.

412. Quick reissue of lost clothes. "Waste has been eliminated and better distribution effected by maintaining regimental reserves of clothing and individual equipment. Socks, underwear, blankets, and other items frequently lost, are carried by the service company and reissued when needed. Individual barracks bags have been done away with and the extra clothing is issued on an exchange basis. A pair of socks is taken from each man daily, sent to the laundry unit for washing, and returned to the unit with the rations."--36th Inf Div.

III METHODS OF EXPEDITING SUPPLY.

413. Radio net for supply officers. "An SCR 284 radio for the battalion supply officer netted with the regimental service train and regimental command post will expedite battalion supply activities. In one instance the use of the radio resulted in the movement of emergency ammunition from the dump twenty minutes before the foot messenger arrived with the request for it."--CO, 116th Inf Regt.

414. Carrying parties. a. "The situation generally required carrying supplies from 400 to 1500 yards to the troops. A priority of supplies was set up as follows: ordnance, ammunition, rations, post exchange rations, blankets and shelter halves, cleaning materials, new clothing and water. Water was given low priority because of its weight. The water supply problem was solved by taking forward empty cans and a chlorinating solution. Companies filled these water cans from nearby streams and purified their water with the chlorinating solution. High losses in water cans were experienced as a result of shell fragments and machine gun fire.

b. "Requests for supplies by carrying party must be made 24 hours in advance; the individual making the request must be informed of the priorities so that he can properly proportion his requests."--28th Inf Div.

415. Use of light tanks. "A company of light tanks was used in the supply system when heavy enemy fire and rough terrain made it difficult to operate trucks. Supplies for two infantry battalions and two medium tank companies were brought to an intermediate point by trucks and trailers. Trailers were then coupled to the light tanks and the supplies in the trucks were reloaded on the tank rear decks. Only two light tanks were lost as a result of enemy fire during the four days of operation."--G-4, 7th Armd Div & CO, Co D, 40th Tk Bn.

IV SIGNAL MATERIEL.

416. Radio repair. "The regimental headquarters company radio repairman operates his repair shop on the service company train, handling all radios issued in the unit. Radios are now rapidly repaired and a considerable burden is taken off the division signal company."--S-4, 115th Inf Regt.

417. Supply channels. "We handle all signal supplies through communication channels. Battalion communication officers submit requests to the regimental communication officer, who in turn passes them on to the division signal supply officer. The supplies are picked up from the higher unit by the lower, using the same channels. The regimental S-4 disregards communication requisitions submitted through S-4 channels and thus avoids duplications. Advantages are that signal supplies can be obtained and repairs effected more rapidly. Critical signal supply items can be regulated more easily by the communication officers."--CO, 47th Inf Regt.

V BATTLEFIELD SALVAGE.

418. By battalion. "Our system of recovering battlefield salvage is this: Battalion ammunition and pioneer platoons follow the companies and place recovered materiel in squad piles. Each company supply sergeant takes from the piles such items as his company can use. The remainder is placed in a battalion pile and turned over to the regimental S-4 who cleans, sorts and reissues it and turns in what is not required to division G-4."--Ex O, 2d Bn, 131st Inf Regt.

419. By regiment. a. "A salvage crew of one officer, one noncommissioned officer and four men with the duties of clearing the areas of all salvage, evacuating the dead, and

handling the effects of casuals, has made it possible to reclaim and reissue large quantities of ordnance and individual clothing and equipment."--S-4, 115th Inf Regt.

b. "We have organized a graves registration section consisting of one officer and 30 men. Seven men are attached to each battalion during attacks for the removal of battlefield dead. When we defend, these sections police the area for abandoned equipment. Company supply sergeants are good men to direct this search as they know the former locations of their companies.

c. "We keep a noncommissioned officer at each aid station to collect organizational equipment--particularly watches and compasses--from the wounded. The battalion supply officers pick up this equipment daily."--S-4, 334th Inf Regt.

420. By division. "We organized a division salvage detail of one noncommissioned officer and three privates, with a 2½-ton truck, to work directly under G-4. The detail searches areas that have been cleared or are being cleared by units of the division and turns in all salvage to the division quartermaster. In the first few days materiel collected by the detail included: 55 overcoats, 90 raincoats, 50 shovels, 37 shoes, 30 helmets, 10 overshoes, 15 blankets and 702 gasoline cans."--G-4, 5th Inf Div.

421. By nondivisional units. "Exercise for men normally confined by headquarters work was turned into a useful activity in the 430th AAA Battalion. Each officer and enlisted man of headquarters battery was required to take a daily one hour and fifteen minute hike and to carry back as much salvageable property as he could find. In six days the system netted: 800 gasoline cans, 120 water cans, 16 M-1 rifles, 60 miles of field wire, 35 wire reels, one truck tire, 14 blankets, 11 raincoats, 26 pairs of woolen trousers and much other materiel." --AAA Officer, XIX Corps.

VI MOTOR MAINTENANCE.

422. Daily vehicle check. "A daily check of vehicles is facilitated by placing the maintenance truck between the battalion kitchen train and the front lines on the main supply route."--Motor O, 2d Bn, 398th Inf Regt.

423. Daily vehicle inspection. "Tire and vehicle maintenance have been improved by having every officer in the group inspect one vehicle per day. This results in every vehicle being inspected every three or four days."--CO, 115th AAA Gp.

424. Regimental inspection crews. "The maintenance section has been divided into inspection crews with the responsibility of making periodic systematic inspections of all organic transportation. They have detected minor deficiencies that might soon have become serious."--S-4, 115th Inf Regt.

425. Saving trailer springs. "A two-inch block of rubber between the axle and frame of a ¼-ton trailer in place of the present block has reduced the number of broken springs." --EM, Hq Bn, 967th FA Bn.

426. Preventing flat tires. "One company reduced the daily average number of flat tires from 17 to two after the division started an active campaign to have all drivers probe their tires to locate and remove embedded metal which had not worked into the tires far enough to cause a puncture. A surprising collection of nails, screws, and even .30 caliber bullets was uncovered."--100th Inf Div.

427. Saving gasoline. a. Method. "Gasoline can be transferred from 55-gallon drums to five-gallon cans quickly and without waste by using a little salvage material and the

procedure described below:

(1) "Drill a hole large enough to permit insertion of a piece of one inch-pipe in the end bung of a 55-gallon drum. Insert a pipe long enough to extend almost to the bottom of the drum. Bend the pipe several inches above the bung so that it will extend to the outer edge of the drum. Weld the pipe to the bung and connect a faucet to the outside end of the pipe.

(2) "Drill a second hole in the bung and weld a valve stem from an automobile tire into the hole.

(3) "Introduce air pressure into the drum through the valve by means of an air compressor or a hand pump.

b. Mobility. "The dispenser can be moved easily from drum to drum and a length of gasoline hose can be fastened to the faucet to avoid holding the five-gallon can off the ground while filling. We sometimes mount the drum on a hand truck and roll it down the line of cans."--Lt, CWS.

VII ORDNANCE ITEMS.

428. Responsibility of regimental ammunition section. "Ordnance supply and repair has been speeded by placing the responsibility for the requisition, issue, and repair of all weapons on the regimental ammunition section. The munitions officer has given one of his sergeants the specific duty of collecting items for repair and of receiving them from the division ordnance company for reissue."--11th Inf Regt.

429. Regimental ordnance shop. "We attach the armorer-artificers from all rifle companies to the service company, and give them a suitable place to work. The plan accomplishes these things:

a. "Spare parts and accessories are pooled, giving better inventory and requisition control.

b. "Supervision by the munitions officer increases the men's efficiency. The necessity of evacuating arms for repair has been reduced.

c. "Salvage squads may be sent out from this group to clear areas which the battalions have been unable to search."--Mun O, 397th Inf Regt.

430. Ordnance mechanic from division. "Ordnance small arms service to the infantry regiments was improved by attaching a small arms mechanic from the division ordnance company to each regiment. He is responsible for performing certain third echelon maintenance, for supervising the work of regimental armorer-artificers on first and second echelon maintenance of salvaged arms, and for keeping thoroughly informed as to the ordnance needs in the regiment. The division ordnance team contacts him when arriving in the regimental area and does the necessary work without bothering S-4 personnel who are usually too busy to keep a detailed check on all ordnance equipment."--Ord O, 102d Inf Div.

431. Teams from army ordnance units. a. Organization and employment. "We send to each regiment an ordnance team composed of one noncommissioned officer and six privates from the small arms sections of army ordnance units which are supporting the corps. The teams usually work in the regimental train bivouac area. Weapons are sent in from aid stations, units, and battlefield recovery teams. The ordnance team has a small stock of parts and weapons from which to make exchanges or replacements.

b. Advantages. (1) "Weapon resupply is quicker.

(2) "The added speed in servicing reduces damage by rust.

(3) "Prompt service improves the morale of the combat troops."--Ord O, XIII Corps.

Chapter Twenty

COMBAT TIPS AND BATTLEFIELD EXPEDIENTS

"Work hard with inexperienced men. They will help you in battle if you help them in training. Don't forget extra hours on the drill fields save lives on the battlefield."--T/Sgt Benjamin Frishman, Co A, 109th Inf Regt.

I HELP YOURSELF AND HELP THE MEDICS.

432. Self first aid. "We train our men to apply first aid to themselves. In giving the training some men in each company are declared wounded in a certain manner. They are then checked, timed and corrected on their application of first aid to themselves. This system accomplishes these good results: It decreases the loss of fire power and exposure of individuals trying to help another who is wounded, and increases the men's confidence in their own treatment, thereby decreasing their fear of wounds and their susceptibility to shock. We require each man to carry three first aid packets in battle--one in his helmet, one on his suspenders and one on his belt."--Report, III Corps unit.

433. First aid packet in front. "We find that wounded men can reach the first aid packet more easily if it is carried just to the right of the belt buckle instead of over the right hip."--Ex O, 405th Inf Regt.

434. Training for more men. "Whenever the situation permits, we rotate two men from each company to the battalion aid station for special training in first aid. Men with this training can take better care of themselves and are always available to replace company aid men who become casualties."--CO, 2d Bn, 405th Inf Regt.

435. Help the litter bearers. a. "Frequently there have been duplications of calls for litter bearers--one man is wounded and three or four calls come in. This unnecessarily endangers the lives of the litter men. Requests should be as specific as possible. Walking wounded should start back to the aid station without waiting for a litter squad. If necessary a guide should be provided for a group of such casualties."--EM, 104th Med Bn.

b. "If a casualty is in a mined area, litter bearers who are sent up should be so informed. A man trained in mine removal can then accompany the litter team and prevent additional casualties."--Lt, 1st Bn, 333d Inf Regt.

436. Preventing trench foot. "To keep feet warm and dry, put on thin socks, then cellophane paper bags from 155mm ammunition, then another pair of thin socks. Be sure shoes are large enough that the added thickness will not impair blood circulation."--99th Inf Div.

437. Keep the medics informed. a. "Battalion and regimental surgeons will manage evacuation problems more intelligently and alertly if they are kept acquainted with the situation. The indulgent doling out of necessary information upon repeated requests from the surgeon discourages him and causes him to lose incentive and initiative."--Surg, 115th Inf Regt.

b. "In night fighting the medics should be briefed as thoroughly as any other men in the outfit. Each litter bearer should be taken to the OP ahead of time so he can see exactly how to get up and back the quickest way."--415th Inf Regt.

II SHELL REPORTS.

438. Get them in fast. "Units receiving shellfire must learn to report it promptly, giving data as to number of rounds, caliber, time, approximate azimuth to enemy guns as indicated by shell furrows, etc. Shell fragments, especially those containing portions of rotating bands, are particularly desired. This will aid in bringing in quick counter-battery fire to stop the shelling."--XX Corps Arty.

439. Don't wait until YOU are fired on. "Troops must learn to report and ask for counterfires against observed enemy weapons or fires, even though not directed at them. The Germans often cross the fires of their artillery, mortars, machine guns and direct fire weapons. Men must realize that good teamwork in reporting them will assist the entire advance."--S-3, 112th Inf Regt.

III PROTECTING YOUR EQUIPMENT.

440. Tire conservation. a. "Vehicle drivers must be reminded that use of the winch often will save their tires. Recently, the driver of a bogged-down armored car wasted rubber by spinning his wheels for 40 minutes. A passing officer required him to use his winch and the car was extricated in two minutes. The crew had not used the winch because they would have to clean the cable."--CO, 14th Cav Gp.

b. "Tires are protected from shell fragments by sand-filled ammunition boxes quickly placed against our truck and howitzer wheels when we move into a new position."--CO, Btry B, 325th FA Bn.

c. "Tire life is prolonged by rotation in accordance with charts maintained for each vehicle which show when rotation is due and include changes resulting from flats."--1106th Engr Combat Gp.

441. Radiator protection. "Most of our general purpose vehicles operating in front areas carry the spare tire on the front of the vehicle to protect the radiator from shrapnel. The chance of damage to the tire is the same on the front or back."--Maint O, 32d Armd Regt.

442. Protecting maps. "We make map covers from the transparent powder sacks in 155mm howitzer ammunition. These sacks may be used as they are or made into envelopes by cutting them and sealing the edges with adhesive tape. Infantry units can obtain these powder sacks from the artillery for every medium battalion receives more than they can use."--Ex O, 974th FA Bn.

443. Keeping the bore clean. "A K ration cellophone bag over the muzzle will keep the bore of a 57mm gun clean and it does not have to be removed for firing."--99th Inf Div.

444. Reducing wastage of photos and maps. a. "Maps, aerial photos, photo mosaics and town plans are often wasted because distribution is made too soon and the unit is required to attack in another sector. Even if plans are not changed, an unrestricted early issue results in many lost or discarded maps and photos because small units have no means of properly transporting and caring for them.

b. "One solution is to issue photos and maps in two lots. The first issue should be in a minimum number for planning purposes. The second issue should include all maps and photos to be carried in combat and should be made shortly before the action when it becomes clear what units will be operating in a particular area. Each echelon should hold out a small reserve of photos and maps to allow for substitutions of units and changes in plans."--Bn and Regtl S-2s, XIX Corps.

445. Protecting your communications. "Since communications directly affect the battle efficiency of a unit, every soldier must be taught to protect wires from damage. I have seen many instances were lines had fallen down and were being destroyed by passing vehicles in the presence of other soldiers who failed to take even the simplest step to correct the situation. Wire lines must be protected from harm by all soldiers regardless of their branch or rank."--AGF Observer.

IV CONTROL AND SECURITY.

446. SOP for small units. "We used the following SOP for small unit control at halts and in bivouac: The platoon leader selects a spot easily identified even in the dark and designates it as the platoon assembly point. The section, if any, and squad leaders then take similar action. After each unit is dispersed a runner is sent to the next higher echelon. A leader allows no man to leave his squad area or even to move about indiscriminately within this area after dark. To assemble, the men move successively to their squad, section and platoon assembly points."--1st Inf Div.

447. Liaison must be positive. "Platoon leaders must check on the ground the location of flank units. A platoon of tanks was reported by higher headquarters to have withdrawn from my flank; only after I contacted the tank platoon leader did I learn that he was still there and had no order to withdraw."--Lt, 773d TD Bn.

448. Do not jeopardize the OP. "Well-meaning infantrymen who attempt to crowd about the OP to observe the results of the fire or to steal a look through the BC telescope must learn that they are inviting fire from the enemy. OPs are high on the priority list of enemy targets and the importance of their camouflage discipline can't be overstressed."--FA Bn.

449. Little danger from enemy direction finding equipment. "Inexperienced troops often believe that use of low-powered infantry radio sets will draw fire as a result of being located by direction-finding equipment. Carelessness in camouflage and in radio security is the real reason these sets are subjected to enemy fire. Exposure of a man or vehicle carrying a radio or reference in the clear to a nearby landmark will provide the enemy with a good target, but direction-finding equipment will not. Direction-finding equipment of a sufficient accuracy to provide information for artillery fire is relatively immobile and must be set up some miles in rear of the enemy lines. The low-powered infantry radio sets do not furnish sufficient signal for this direction finding equipment. Location by direction finding becomes a possibility only when done in conjunction with poor camouflage or poor radio security."--12th Army Gp.

450. Radio discipline. "We need more radio discipline. Even old-timers slip up on this. I had quite a conversation with a Jerry one day until he slipped up on the call sign."--Capt, 11th Inf Regt.

451. Know the situation on your flank. "Don't depend on information you receive about the location of friendly troops on the flanks. Always maintain flank guards far enough out to command the high ground on each side."--Inf Plat Ldr.

452. It might work the other way. "On a very dark night one of our patrols was able to detect an enemy emplacement by the smell of burning tobacco."--S-3, 398th Inf Regt.

V INTELLIGENCE TRAINING.

453. "To train our men in map reading, observation, and accurate reporting, we require every man--including cooks and reinforcements--to observe some military activity and write a message giving the location and describing what he saw. Improved G-2 information has resulted."--G-2, 5th Armd Div.

VI FIRE AND MANEUVER.

454. Know and use your fire power. "Many men do not realize the power of their own small arms fire. Recently one of our outposts of four men, located about 200 yards in front of the main line of resistance, saw a German night patrol of eight men move across their front only about 30 yards away. Another group of five enemy went in the other direction. The outpost personnel said that they did not fire because they were outnumbered and firing would disclose their position. Both groups could have been eliminated by a few blasts from the BAR and two or three grenades."--Pfc M. T. Didelot, Rifle Co, 30th Inf Div.

455. Steady and distributed fire needed. "Company commanders agree that riflemen must be encouraged during an advance to keep up steady fire on a suspected target instead of waiting for the appearance of a definite target. Well distributed fire will keep the enemy down, but too often all men fire at a single spot when a target does appear, instead of keeping distributed fire over all the suspected target area. Fire distribution is important."--Third Army.

456. Keep moving--unless wounded by snipers. a. "One of the fatal mistakes made by infantry reinforcements is to hit the ground and freeze when fired upon. Once I ordered a squad to advance from one hedgerow to another. During the movement one man was shot by a sniper firing one round. The entire squad hit the ground and froze. They were picked off, one by one, by the same sniper.

b. "Men should be taught to play 'dead'--that is, remain perfectly still--if wounded by sniper fire. If they move, the sniper will fire again."--Plat Ldr, 9th Inf Div.

VII PRISONER OF WAR INFORMATION.

457. Use enemy maps. "It has been found that prisoners of war will not point out their command posts on an American map due to their inability to read these maps, but generally will readily indicate troop locations, etc., on a German map. We have furnished all our intelligence sections with copies of German maps which have been reproduced by our corps. This has greatly facilitated the transmission of information, in addition to aiding interrogation."--XIX Corps.

458. Or aerial photographs. "We sometimes use a photo interpreter and the latest photos to aid in the interrogation of prisoners. The accuracy of locations is improved and looking at the photos stimulates the memory of the prisoners and brings out additional information. The photos also permit an immediate check on the veracity of the prisoner and he is apt to be very careful of his statements when he sees each location slipped under the stereoscope for verification."--XX Corps Arty.

459. Guards should turn over documents when they turn over prisoners. "Do not separate prisoners and the documents they carry. Many times we get marked maps and documents that we need the prisoners to explain."--G-2, 7th Armd Div.

460. Give encouragement. "A few words of praise or acknowledgment to soldiers who turn in captured documents gives them and others an added interest in doing so."--Lt, 92d FA Bn.

VIII RUMORS.

Note: Credulous acceptance of unverified reports or rumors is an ever present danger in the battle area. It is characteristic of such rumors that they spread rapidly and grow as they spread. To emphasize the dangers of accepting and repeating unverified reports, there are presented below a number of actual occurrences.

461. Battalion withdrawal. "A rifle company ammunition bearer, coming from the rear, reported to his company commander that the battalion command post was withdrawing. The company commander, about to withdraw his company as a result, was persuaded by an adjacent company commander to check the story first. The facts were that the battalion command post had been hit by two 88mm rounds and had been moved to an alternate location a short distance to the rear."--CO, 2d Bn, 10th Inf Regt.

462. The parachutists are coming! "A regimental headquarters notified its battalions at 1300 hours that higher headquarters reported an enemy parachute landing in the vicinity of a particular hill. A check was begun. Thirty minutes later a modifying report stated that two parachutes had been found on the ground. By 1530 hours it was established that an American pilot had bailed out over the area."--CO, 2d Bn, 12th Inf Regt.

463. The Germans are coming! "A few men in a quartermaster truck company observed American engineers preparing bridges for demolitions and noted that other bridges already had been blown. They ran back to their company with the story that all the bridges had been blown and the Germans were coming. The entire company moved hurriedly to the rear leaving behind tires, gasoline and equipment."--VI Corps.

464. Too much imagination. "A friendly weather unit used a balloon device to assist in wind readings. The balloons were observed by many while in the air and one of the devices was found on the ground. They were 'enemy parachutists' to those who saw them in the air and 'anti-radar balloons' to those who saw them on the ground."--XII Corps.

IX WEAPONS AND AMMUNITION.

465. Use of antiaircraft half-tracks. "M-16 antiaircraft half-tracks have been used effectively in support of infantry, tank, and tank destroyer units. When so employed they should always be committed in pairs for mutual protection against such enemy groups as bazooka patrols. With infantry, it is advisable to use them on missions directly from the battalion command post rather than limit them to a position in the line. They can move quickly and employ their fire power either to stop enemy thrusts or to reduce troublesome enemy strong points in an attack. When used with tanks or tank destroyers, the half-tracks can keep enemy tanks buttoned up while the tanks or tank destroyers engage them. The weapon, however, must not be used against armored vehicles except in conjunction with tank destroyers or tanks. It should be remembered that the M-51 trailer mount, though armed like the M-16, is not always suited for the same type of missions due to its limited mobility." --CO, Btry B, 635th AAA (AW) Bn.

466. Moving 57mm guns into position. "We mount ¼-ton truck pintles from salvaged vehicles on the front bumpers of all our ¼-ton antitank vehicles. The 57mm gun can then

be pushed, barrel forward, into difficult firing positions with minimum loss of time and exposed movement."--CO, AT Co, 377th Inf Regt.

467. Carrying the 81mm mortar. a. "Carry the base plate in front--it will stop a lot of shell fragments.

b. "To carry the tripod easily, spread the legs, and carry one leg on each shoulder." --Co D, 378th Inf Regt.

468. Flamethrower and white phosphorus grenade. "We give our flamethrower teams white phosphorus grenades to be used to light the flamethrower fuel if it fails to ignite when ejected. We have also carried the flamethrower fuel in bottles to throw against the target, followed by a white phosphorus grenade."--CO, 2d Bn, 405th Inf Regt.

469. Praise the Lord and pass the ammunition. a. "Both leaders and men must check to see that automatic rifles and antitank ammunition are kept moving to the front even when the men originally carrying it are wounded. One time when the bazooka ammunition carrier was wounded, we were without this ammunition for several hours simply because no one thought to pick it up."--Lt, Co E, 330th Inf Regt.

b. "My company was crossing a river and they had really loaded us down with ammunition. They gave me a mortar round, a bazooka round, a rifle grenade, three hand grenades and two bandoleers of armor-piercing. And I already had my own belt full of ammunition. How I griped: 'Here I am 37 years old,' I said to myself. 'How can I carry a load these 21-year-olders are staggering under!' But I did manage to carry it and thank God I did. We crossed the river and Jerry attacked. We finally repulsed him but, before we did, we had fired not only all our ammunition but all the Jerry ammunition we could lay our hands on. Like all infantrymen, I like to travel light, but I've learned the hard way that I must carry every round of ammunition issued to me."--Pvt H. Israel, Co K, 357th Inf Regt.

470. M-1 flash hider. "We have improvised a flash hider for the M-1 rifle by cutting off the primer end of a .50 caliber cartridge case and securing the case to the muzzle of the rifle. The flash can then be seen only from directly in front."--Lt, Co B, 62d Armd Inf Bn.

X DISCIPLINE.

471. Discipline saves lives. "More emphasis in training should be placed on discipline. In my battalion, company commanders who had well disciplined companies moved faster in the attack and incurred fewer casualties than those in whose companies discipline was lax. We had many casualties among our officers and noncommissioned officers, partly because they had literally to lead the men by the hand to insure accomplishment of their mission."--Bn Comdr, 22d Inf Regt.

472. When flak is falling. "We have lost over 40 men in the regiment through failure to take cover from falling flak. Too many men follow the foolish practice of gaping at enemy planes overhead."--Ex O, 32d Armd Regt.

473. Don't find out too late. "There should be some way, prior to going into combat, of showing men how foolish it is to throw away equipment, such as grenades and grenade launchers. After a while our men found out how valuable they were, but often it was impossible to get some of these abandoned articles when we needed them most. With our close air support, a front line panel display often gives the troops a much better feeling but panels are bulky and often thrown away--don't let them do it."--Plat Sgt, 109th Inf Regt.

474. The details are vital. "Every 'little' detail must be checked by alert junior officers to assure successful operations. Indifference and complacency and the 'let the sergeant do it' attitude lead to failures which cost lives. Whether it be artillery, infantry or any other branch--when things go well it is because plans have been well laid and preparations have been thorough; when they fail, it is usually because the small details haven't been checked. For example:

a. "Before an attack the artillery forward observer must check his radio--just because he has drawn a new battery he can't assume it's a good one; and he must see that the artillery concentrations are properly plotted on his map--just having the overlay is not sufficient. Failure in one of these details can mean the difference between a successful attack and a costly defeat.

b. "When an infantry platoon leader is charged with posting a guard an hour before dusk he must see that it's posted then--not two hours after dark. If he is responsible for machine gun positions, he must check to see that they are properly chosen and that they are dug in--not just assume that all this is taken care of.

c. "Care of equipment is often not sufficiently emphasized. Critical and delicate items, such as radios and telephones, are banged around and thrown in the mud. Truck drivers will drive over gas cans lying in the road rather than make the effort to avoid them. Important items of equipment are often left lying in the road and many men pass them by without making the slightest effort to move the article to a safe place."--Capt, 229th FA Bn.

475. Men must know succession of command. "All men must understand clearly the succession of command in a platoon and squad and they all must be given the situation and the plan of action. On one occasion when the platoon leader and most of the noncommissioned officers had become casualties, an entire platoon ran back to ask the company commander what to do. They were willing to fight but had no leader who knew the plan."--T/Sgt, Armd Div.

476. Don't scatter your equipment. "Men went into action without helmets, canteens, intrenching tools and other necessary equipment because they had scattered it in the dark and were unable to find it when required to move in a hurry. One machine gun ammunition bearer who discarded his personal weapon when he had to assist in carrying the machine gun was later wounded because he had nothing with which to defend himself."--T/Sgt Walter J. Wirski, Co C, 55th Armd Inf Bn.

477. Carelessness helps the enemy. "We have lost men and vehicles because the following basic rules have been violated:

a. "Units being relieved must furnish complete information of friendly minefields to the relieving units.

b. "When our minefields block a road or an area that friendly troops may use, they must be marked and guarded.

c. When a friendly minefield is no longer needed it must be taken up."--CO, 14th Cav Gp.

XI SQUAD BRIEFING IS IMPORTANT.

478. Care decreases casualties. "When all available information is passed on properly to all men before an action it increases the efficiency of the unit and decreases casualties. Sketches and maps should be as detailed and accurate as possible. A careful check should be made to see that every man knows his own duty, his squad mission, and as much as possible about the objectives and movements of the other units."--Pfc R. S. Todes, Co E, 377th Inf Regt.

479. Every man is important. "Every man in the squad should listen to his squad leader's orders with the thought in mind that he may have to be the squad leader before the battle is over."--T/Sgt J. D. O'Dell, Plat Sgt, Co E, 377th Inf Regt.

XII AFTER BATTLE RELAXATION.

480. Get men out of foxholes. "An effective way to relieve tension is to get men out of their foxholes, when the situation permits, and have them move around and contact other members of the squad. I also have them observe shell holes in the area to convince them they were not as close and concentrated as they seemed."--T/Sgt Breinard, 330th Inf Regt.

481. Use rest camps when possible. "Regimental and battalion rest camps are of inestimable value. A battalion camp may not be more than an artillery-proof dugout with a stove and hot coffee in it. But to a soldier on the verge of exhaustion, an opportunity to dry out in a safe place for a few hours is a haven of refuge that will revive his will to fight. Kitchen personnel can be used to operate the rest camp."--3d Bn, 180th Inf Regt.

482. Men want to "know the picture". "I found it helpful to have after battle conferences for all men and officers when a battalion was pulled out for rest. First I would give them the whole picture from the viewpoint of the army, corps and division; then I would go into detail concerning what the battalion had done, what German units they had fought, and how many casualties they had caused the enemy. The men ate it up. This procedure keeps men abreast of the situation, increases their morale, and keeps up their fighting spirit. In addition, it gives me an opportunity to emphasize how much of our information regarding the enemy was obtained from prisoner of war interrogation, and to impress on them how disastrous their talking would be if they were captured."--Asst G-2, 34th Inf Div (Italy).

XIII EMERGENCY USE FOR CAMOUFLAGE NET.

483. "Camouflage nets can be used as road mats to move bogged-down vehicles. A truck got stuck one night and two other vehicles mired trying to move it. Finally the camouflage nets were used as mats and all the vehicles were able to move out under their own power."--Co B, 279th Engr Combat Bn.

XIV IMPROVISED FLARES.

484. "We used thermite grenades as a substitute for flares by attaching them to the rifle grenande adapter and firing them with the M-7 grenade auxiliary booster charge. They give good visibility for one minute and can be used at ranges up to 150 yards. The firer must be well concealed."--Ex O, 2d Bn, 406th Inf Regt.

XV USE SPEED TO HIT THE ENEMY WHEN HIS HEAD IS DOWN.

485. "Instances have been reported where infantry was not ready to move after an extensive artillery preparation. Some infantry units apparently do not realize that supporting fires do not destroy the enemy, but merely force him underground for a brief period."--CG, 79th Inf Div.

XVI USE OF CUB PLANES FOR PHOTO MISSIONS.

486. Complete processing. "We improvised a photo laboratory and dark room by making plywood sides and top for a one-ton trailer. In this laboratory we do the entire processing, including enlargements, and can normally deliver about 20 photos two hours after a request for a photo mission. All photos are oblique and are taken from liaison planes with a K-20 camera.

487. Large quantities possible and valuable. "In addition to the usual use of these facilities for artillery purposes, it is possible to reproduce sufficient copies for infantry battalions. Although the facilities of the improvised laboratory are limited the supply necessary for a division can be produced in less than 24 hours.

488. Photos used by air OPs. "Enlarged (10" x 14") photos which show the locations of any suspected 'set' hostile artillery are used by our air observers. Should the enemy open fire, our fire is delivered on the suspected location nearest to the point indicated by the observer. Often the fire so delivered has been right on the hostile artillery.

489. Fire effect information. "Some information as to the effect of our fire is also obtained from oblique photos taken by our cub planes to supplement data obtained later from air force reconnaissance sorties."--Asst S-2, XIX Corps Arty.

XVII SEARCHLIGHT ILLUMINATION.

490. "This division has operated on several nights while using the illumination furnished by British antiaircraft searchlights. The lights were placed from 4,000 to 6,000 yards behind the front line, in defilade, and adjusted on low clouds to give a reflected light. The resulting light over a large area was equal to that of a half-moon and was extremely helpful. Careful planning and adjustment are necessary to achieve desired results without giving away your plan to the enemy. Advantages of this use of lights were:

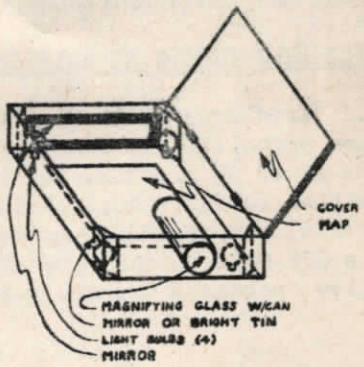
a. "Removal of enemy minefields at night was simplified and expedited.
b. "Black-out driving in the division area was much safer.
c. "Defense was simplified because the foreground was lit up, thus making enemy patrols more visible.
d. "Engineers were able to do emergency road repair in forward areas at night."--G-3, 84th Inf Div.

XVIII MAPS FOR THE PLATOON LEADER.

491. "We have been able to make 1:10,000 contoured maps available to our platoon leaders in all except fast-moving situations. The map is prepared in the division and reproduced by the corps engineer topographical company. A 1:25,000 map is first blown up to 1:10,000 on a screen. Two tracings are made, one in brown of the contours and one in black of all other features. Additions, corrections, and deletions are made by photo interpretation teams using data from aerial photographs and verified information from patrols and prisoners. Corrections and additions require about one hour per grid square if the 1:25,000 map is fairly accurate and about three to four hours if not. The completed map is more accurate, easier to read and contains a wealth of detail not shown on the 1:25,000 map. It has been of great value to units, patrol leaders and the artillery."--Asst Div Engr, 2d Inf Div.

XIX MAP ENLARGER.

492. Construction. "We have constructed a simple projection machine for map enlarging. It consists of a closed wooden box, 1½' x 1½', with bright tin or mirrors placed across each corner facing the center of the box (see sketch). Light bulbs are placed in each corner in front of the mirrors. A number two can with a magnifying glass inserted in one end is mounted in a hole cut in the front of the box in such a way that the projection can be focused by sliding the can back and forth. A mirror is placed at the back of the box slanting about 30 degrees towards the front. Painting the interior of the box white increases reflection and clarifies the picture.



493. Operation. "The map is placed on the floor of the box and the projection focused by moving the can containing the magnifying glass. Grid lines should be drawn on the paper on which the projection is focused and the grid lines on the map brought into conjunction with these. The details of the map are then penciled."--Asst G-3, 398th Inf Regt.

XX IMPROVISED MINE PROBE.

494. A useful "cane". "We have used the rods from 155mm cloverleaf ammunition containers to aid in locating mines. We put a point on the rod and bent one end to form a handle. We issued about 250 per infantry regiment.

495. Uses. "The cane can be used to discover trip wires by swinging it gently ahead; to feel in advance, when crawling, for trip wires and prongs of mines; and to probe for buried mines. Probing should be done at an angle so as not to detonate mines which require only light pressure."--S-3, 15th Engr Combat Bn.

XXI HOT COFFEE FOR THE FRONT LINES.

496. "Five-gallon water cans can be used to take hot coffee to men in the front lines. If they are first heated with hot water and then wrapped in blankets, the coffee will stay hot for two hours."--CO, 2d Bn, 405th Inf Regt.

XXII USE FOR OLD BA-70 BATTERIES.

497. "Old BA-70 batteries which are too weak to operate the SCR 300 can be used to light command posts. One battery and a 40-watt bulb will provide good light for 24 hours." --CO, Co G, 406th Inf Regt.

XXIII GENERATORS FOR FIELD RANGE M-37.

498. "When there are no new generators available for the range M-37 conversion set No. 2 (simplified), we renew the old ones as follows: The generator is cut in two, slightly off center, and the steel wool which acts as a filter is removed with long-nosed tongs. About three-fourths of a pound of new steel wool is inserted a little at a time and packed

tightly with a broom handle--the more tightly it is packed the more efficient will be the operation of the unit. The generator is then welded back together and put into service."--Div QM, 44th Inf Div.

XXIV FIELD GLASSES.

499. "We wear field glasses, less the case, inside the shirt or jacket. This holds them steady and prevents identification of leaders by the enemy."--Ex O, 32d Armd Regt.

XXV DAILY NEWS REPORT BY TELEPHONE CONFERENCE CALL.

500. "Late news is broadcast each evening to units in the regiment over a telephone conference circuit. The broadcast is given by the intelligence and education section, and lasts 20 to 25 minutes. It is read so as to permit the taking of notes for further dissemination to individuals. The network is made up of 37 stations, including battalion headquarters, company headquarters, and sometimes platoon headquarters. An SCR 300 hand-set and a 22½-volt battery are attached to a EE-8A telephone in place of the regular hand set to give increased volume."--397th Inf Regt.

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